COPA SEAT LEON

User Manual

Leon Super Cup Mk 2

2009 – VERSION 1.0

The SEAT Leon Super Cup Mk2 is a racing car developed by SEAT Sport, based on the new SEAT Leon, which continues the successful SUPERCOPA championship launched by SEAT in 2002.

The main technological innovations developed by SEAT sport for the new SEAT Leon Super Cup Mk2 are:

His direct injection turbo engine is the first time that's used in a manufacturer cup.
Also for the first time his in a manufacturer cup his new DSG gearbox, tuned by SEAT Sport for racing purpose.
Development of an aerodynamic package, with ground effect to increase the down force.

With the new León Super Cup Mk2, SEAT Sport substantially improves the performance of the previous Leon Super Cup, maintaining its commitment to costs and reliability for his customers, strengthening the Cup school spirit and bringing the performance of the car to the higher ranks of touring cars.

Introduction.

This user manual is intended as a helpful guide for the tune-up and service of the Leon Super Cup manufactured by SEAT Sport S.A.

If you have any doubts, enquiries or suggestions, please contact the championship organiser and the car manufacturer:

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1 GENERAL SPECIFICATIONS

Specifications table

Engine		
Tipe		Turbo 4 cylinders
Intake system		Direct fuel injection
Capacity		1984 cc
Bore / Stroke		82,5 x 92,8
Max power		301 CV
Max torque		340 Nm
ECU		BOSCH MED 9.1
Exhaust / dB		Racing catalizator / 98dB
Fuel cell		Origial with two flor pumps
Transmision		
Wheel drive		2 in the front
Gearbox		DSG 6 speeds
Differential		Slip dif with discs
Gear shift		Electrical on the steering Wheel.
Xasis and Sudpension		
Front suspension		McPherson, adjustable on caber, toe and high,
Rear suspension		Multi-link, adjustable on camber, toe and high
Spring		Helicoidal adjustable in high
Front brake		6 piston calliperss, disc 362 mm ventiled
Rear brake		255 mm disc ventilled
Brake pedal		Unitary with brake balance in
Steering		Hydraulic assist
Rims		SEAT Sport 9.5”x18”
Car control		
ECU		Autodiagnosis VAS available
Data adquisition		AIM with 25 CAN + 8 mathematic channels
Body and aerodynamic		
Roll bar		Homologated FIA and Hans adapt
Driver position		Backward to improve the weigh balance
Aerodynamic		Complete flat bottom Splitter Rear diffuser and wing Front wing
Front width (max)		1.858 mm (a 6 grados de caída)
Rear width (max)		1.787 mm (a 6 grados de caída
Overall length		4.476 mm
Wheel base		2.596 mm

1.1 **Engine**

The Super Cup engine comes from the latest-generation 2.0 l Turbo FSI by the VW group. It's technical specifications include the following features:

- Turbo-compressor in cast on the exhaust manifold.
- Monoflow exhaust system with catalyser.
- High-pressure fuel pump.
- No-return fuel system.
- Direct injection into combustion chamber

Description	Value
Engine ID	BHZ / CDL
Type	4 cylinders – 4 valves per cylinder
Capacity	1984 cc
Bore/Stroke	82.5 x 92.8 mm
Compression ratio	9.8:1
Maximum power	220 KW/301 HP at 6500 rpm
Maximum torque	340 Nm/2100 rpm
Intake system	Direct Fuel injection, turbo and specific intercooler
Ignition	One Electronic coil per cilynder
Fuel	Unleaded petrol 98 octane
Generator	90 A
Battery	Dry 26 Ah/280 A

Some interest data:

- The automatic limit control is at 6800 rpm, and this it's done by closing the throttle. This "cut" is very light and difficult to perceive for the driver. To check the adquisition data is recommended and to change the maximum rpm shift light if is necessary.
- The communication with the gearbox Mecatronica is done through the CAN-Bus line permit to control the "Start Mode system" (point 1.2.2).
- The average engine consumption is 0,46 l x km.
- To have the car on optimum conditions we recommend to follow the "Service intervals explained in the point 3.11.

1.1.1 Turbo compressor

The turbo is placed on the back of the engine and is assembled with the exhaust manifold. It's made by KKK and is cooled by water.

Operation:

The usual boost is 1.9 bar. The over boost control is done by a Waste Gate controlled by the ECU. In case a over boost happens, the ECU will acct with different strategies like close the throttle.

1.1.2 Fuel supply system

The improvements introduced in the Leon Super Cup Mk2 are:

Double side fuel tank.

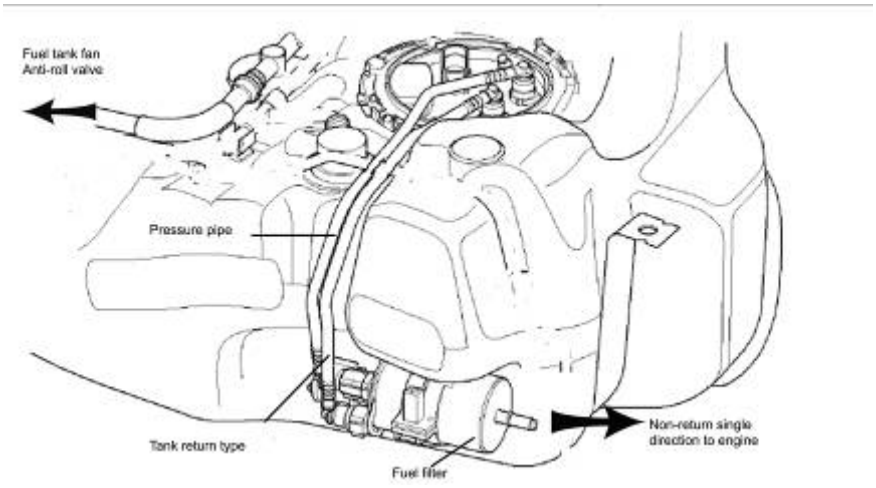
Addition of a second flow pump.

Addition of a homologated 'fast connection'.

The direct fuel injection system inject directly at the combustion camera at high pressure. This injection pressure is variable between 50 and 120 bar depending the engine requirement.

It's advisable to don't run the car frequently with less than 5 litres of petrol because the low pressure petrol pump could be damaged.

The fuel petrol system is able to empty the tank almost completely because of that, the engine starts to misfyre when there are between 3 to 5 l remaining in the tank. This system has to be asembled like shows the following figure 1.



The flow pumps located inside the fuel tank work via a pulsed current control module controlled by the engine ECU giving a modulated pressure between 3 and 7 bar.

If you want to empty the fuel from the tank, consult section 4, "Maintenance", point 4.6.5 "Fuel".

1.1.3 Cooling

The improvements introduced in the Leon Super Cup Mk2 are:

- Replacement of the standard electric fans by a double specific fitted directly to the radiator.
- Adition of 2 adicional lateral water radiator.

To maintain the turbo cooling water recirculation system (approximately 15 minutes after stopping with hot engine), the vehicle main battery switch should not be disconnected.

The fan range it is beetewn 94º C to 87º C.

It's advisable to stop the engine thru the ignition switch, never disconnect the main switch before 15' since the engine has been stopped. (Minimum electric consumption)

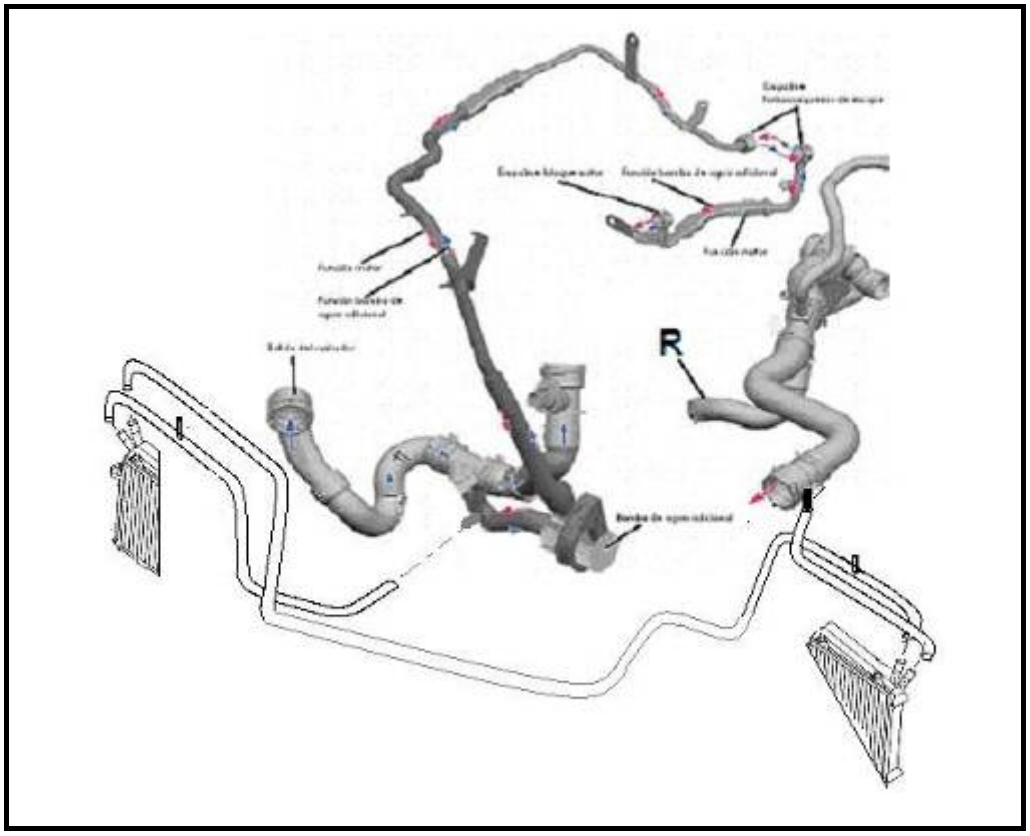
THERMOSTAT

The Leon Super Cup Mk2 has a thermostat in the cooling system on the production cars, The engine cooler fan range it's between on 85°.

It's aloud to disassemble that thermostat. To do so, you have to take off all the mechanic parts from the inside of the plastic that contains them and it's located at the engine behind the generator.

the dissasembling is admitted. Whenever the elimination of the thermostat is decided, the recirculation circuit must be obturate at the same time, (to see figure 2 "tube R") maintaining all the tubes and the assembly position.

Main Cooling system diagram.



1.2 **Transmission**

The SEAT Leon Super Cup Mk2 is fitted with a DSG gearbox. This six-speed gearbox with steering wheel controls has two main operating modes: Tiptronic and automatic, controlled from the steering wheel by the driver through a SEAT sport gearbox mode module. This system combines the best performance of traditional manual and automatic gearboxes.

The improvements introduced in the Leon Super Cup Mk2 are:

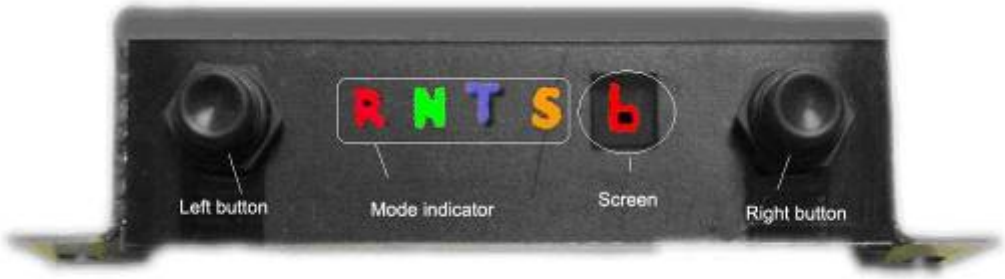
- Specific gear ratio.
- Specific mechanical limited slip differential.
- Replacement of the gear lever by a gearbox mode module and two pads at the steering wheel.
- Specific software.

1.2.1 Gearbox mode module

This SEAT sport design module centralises all the DSG gearbox features at the steering wheel.

Consequently, you can select the different functions of the module by pressing the right and left buttons. The gear engaged it's displayed at the dash screen and at the dial of the module, the mode it's displayed at the module mode indicator (Fig. 3).

Fig.: 3



Neutral mode N:

In neutral mode, the vehicle has not any gear engaged.

Display:	The mode indicator, shows a green '**N**'.
	The Dial shows a number '0 ".
Access:	From Tiptronic mode **T**: Press the left button once.
	From reverse mode **R**: Press the right button once.

Operation: This is the default mode when the engine is started up.

In this mode, the vehicle is in neutral.

When you want to keep the vehicle stopped with the engine running, you should go to neutral otherwise, it will stay in first gear, and will move forward slowly if the brake pedal is not pressed.

Tiptronic mode T:

In this mode, the gears must be changed manually using the gear change levers. This is the mode recommended during the race.

Display: The mode indicator, shows a blue 'T'.

The dial, shows the number of the gear engaged.

Access: From neutral mode **N**: Keep Brake pedal pressed.

Press the right button once (if the button is pressed without pressing the brake pedal, the dial displays the letter 'b ").

From automatic mode **S**: Press the left button once.

Operation: In this mode, the gears are changed up only when the driver presses the right-hand lever marked with a sign **+**.

The gears are changed down only when the driver presses the left-hand lever marked with a sign **-**, it will not happen as long as the vehicle speed has not fallen enough to not over-rev the engine.

If the vehicle comes to a stop (speed = 0), with a engaged gear higher than 1, first gear will be automatically selected.

If the engine speed is below certain value the gearbox will reduce the gear although if the Tiptronic position is on.

Automatic mode S:

In this mode, the gears are selected automatically. This mode enables an alternative use of the gearbox.

Display: The mode indicator, shows an orange 'S'.

The screen, shows the number of the gear engaged.

Access: From Tiptronic mode **T**: Press the right button once.

Operation: In this mode, the gears are changed up and down automatically in accordance with the engine revolutions and vehicle speed.

The driver can change from automatic to Tiptronic and vice versa without having to stop the vehicle. To do this, simply press the right or left button once in accordance with the current mode.

Reverse mode R:

This mode selects reverse gear.

Display: The mode indicator, shows a red '**R**'.
The screen, shows the letter 'r ".

Access: From neutral mode **N**: Keep Brake pedal pressed.
Press the left button once (if the button is pressed without pressing the brake pedal, the dial displays the letter 'b ").

1.2.2 Launch control:

This control enables you to produce an standing start in the shortest time possible.

Operation:

1. Speed = 0 (Stoped car)
2. **Brake pedal pressed.** (Recommended minimum brake working pressure 10 bar)
3. Select Tiptronic or automatic mode.
4. Press the accelerator (engine revolutions will not exceed 4500 rpm).
5. Release the brake pedal and the vehicle will launch off

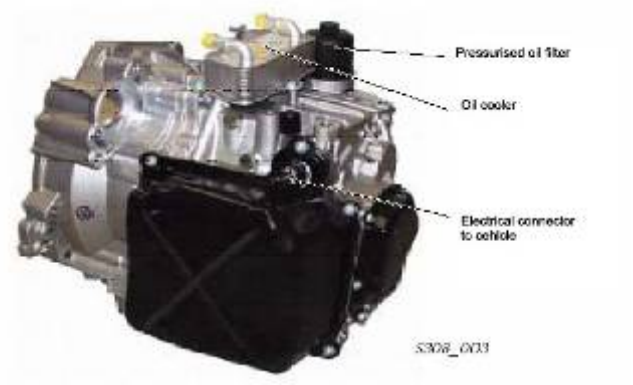
1.2.3 Technical features of the DSG gearbox .

Descripción	Valor		
Gearbox 2008	**6 Speed automatic**		
Gear shift	**On the steering wheel**		
Operating mode	**Triptronic or Automatic-Sport mode**		
Clutch	**Doble clutch in oil**		
Ratios:	Ratios	Total Ratio	Speed 6800 r.p.m.
I	**15/44**	**0.071**	**59**
II	**22/45**	**0.102**	**84**
III	**28/41**	**0.142**	**118**
IV	**38/41**	**0.193**	**160**
V	**32/35**	**0.254**	**211**
VI	**38/35**	**0.302**	**250**
Final group 1-2-3-4	**15/72**		
Final group 5-6	**20/72**		
Differential	**SEAT Sport limited slip with disc ZF Ramps of 25/45**		

View of DSG gearbox.

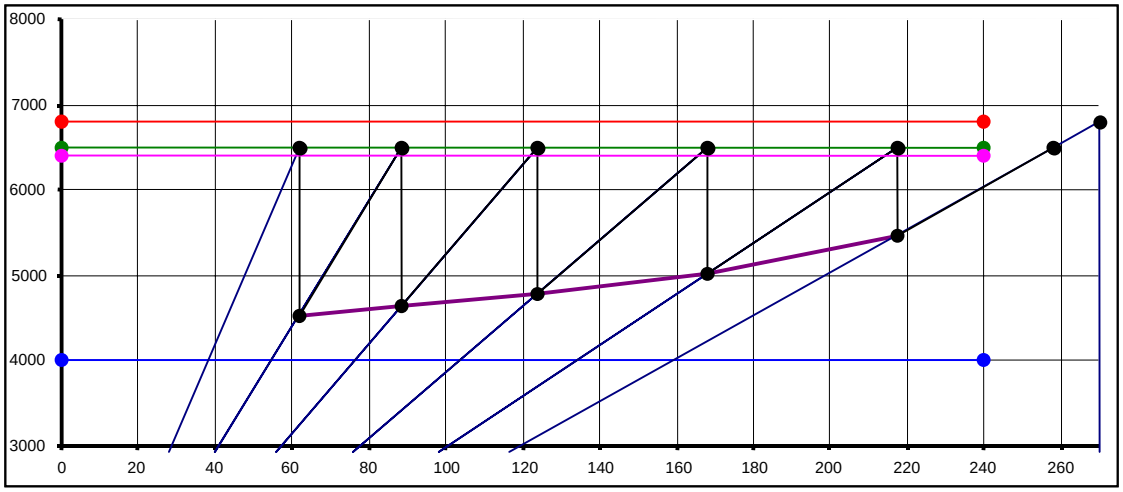
See section 4.2 “Gearbox maintenance”

for capacities and use



Graph 1 shows the simulated acceleration in each gear.

Rpm / Speed



Graph 1

1.3 **Electronics**

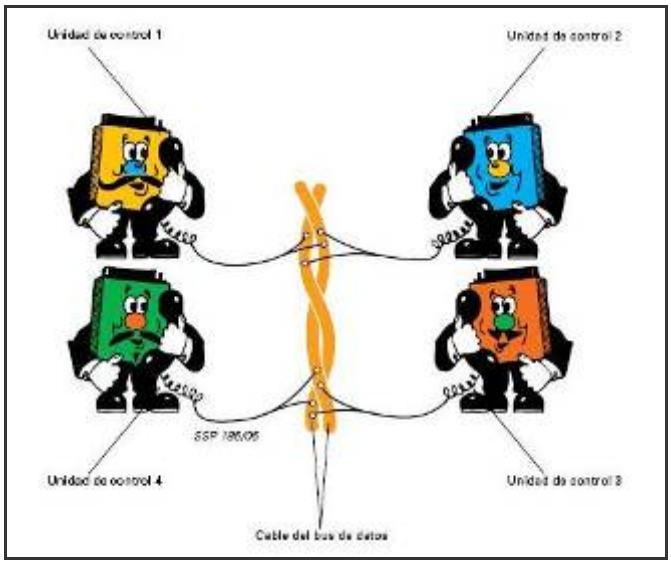
1.3.1 CAN-Bus

The León Supercopa have a complete equipment of “Management Module” connected to one another through a CAN line.

The advantage of this system is:

- Least of electrical wiring
- Least of extra sensors
- Modifications with only changing the software.

To explain in a simple manner, all module are lessening online and only take the information that need in the main time the others are not interested in the information.



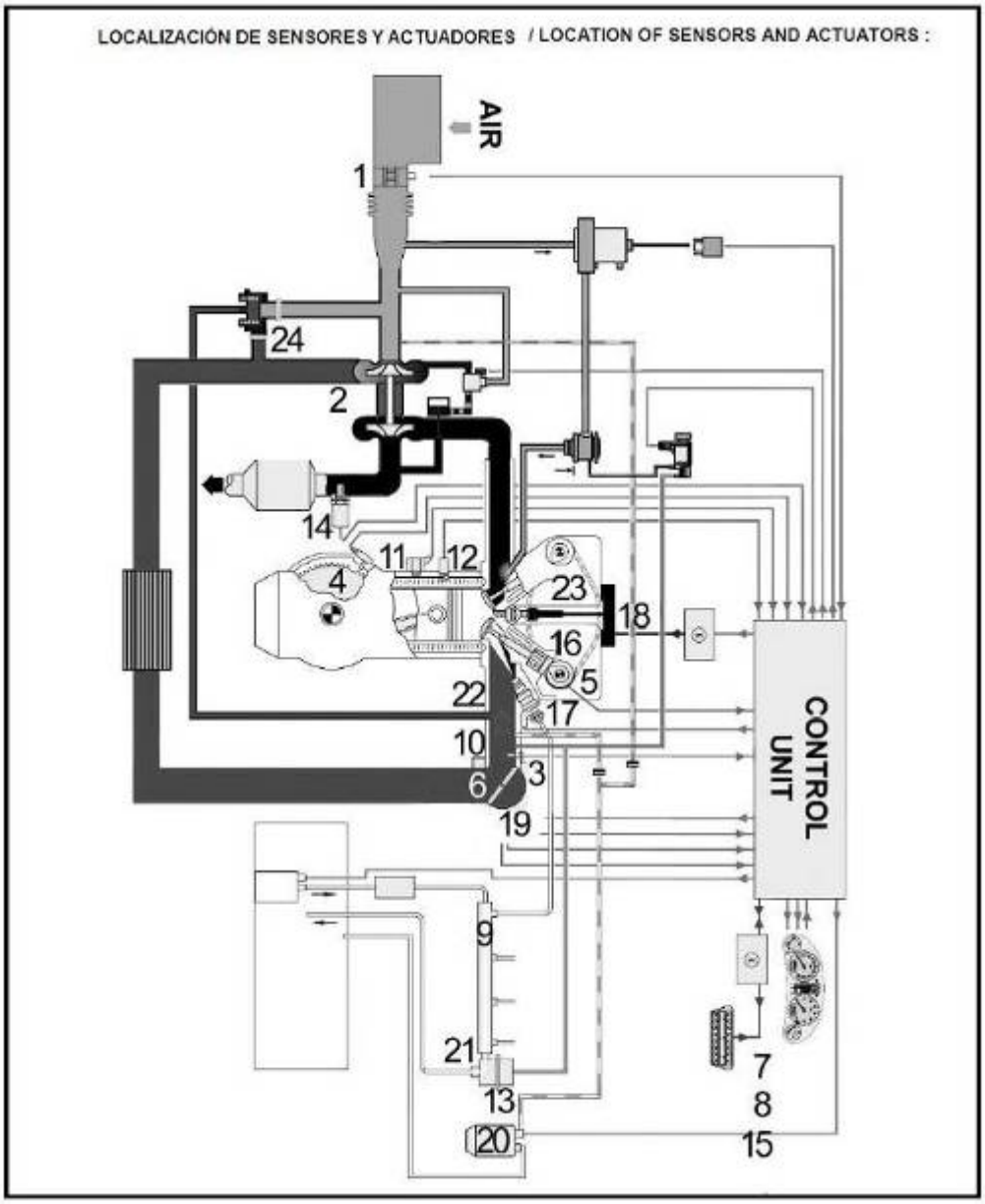
It is essential a good maintenance of the system described in this document at the point "3 Maintenance and Service".
Next is shown the electric components of the ECU management.

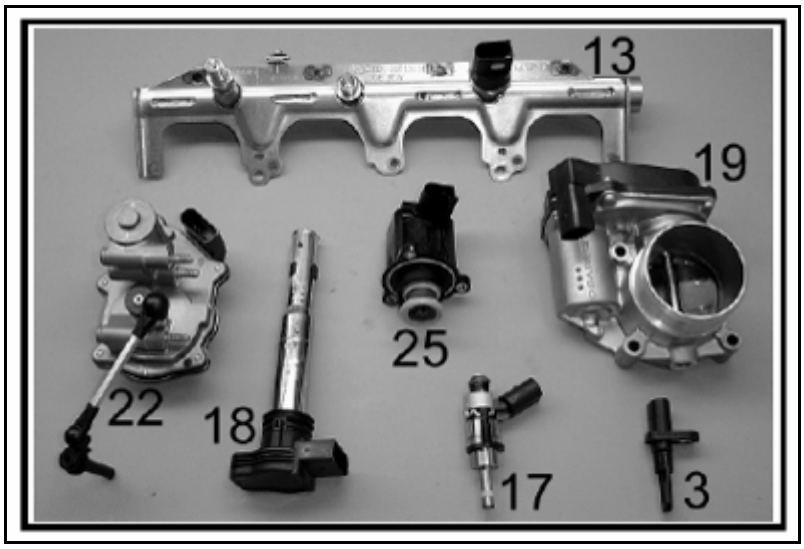
Sensor of inyecctions system

(1) Intake air sensor / (2) Overboost preasure sensor / (3) Intake air temperature sensor / (4) Engine speed sensor / (5) Hall sensor / (6) Throttle valve potenciometer sensor / (7) Gas pedal sensor / (8) Brake swith transmitter / (9) Fuel Temp. Sensor (10) Intake manifold throttle valve sensor / (11) Knocking sensor x2 / (12) Cooling water temperature / (13) Fuel pressure sensor/ (14) Lambda probes x1

Actuators of injection system

(16) Fuel pump / (17) Fuel injectors / (18) Ignitions coils / (19) Throttle valve / (21) Fuel pressure regulator valve / (22) Servo-motor for intake manifolf flaps / (23) Variable timing electrovalve / (24) Overboost pressure regulator


LOCALIZACIÓN DE SENSORES Y ACTUADORES / LOCATION OF SENSORS AND ACTUATORS :
AIR
1
24
2
14
11
12
4
23
18
16
5
22
17
10
6
3
19
CONTROL UNIT
9
21
13
20
7
8
15


13
19
25
22
18
17
3

1.3.2 Dashboard

The Leon Super Cup Mk2 is equipped with a AIM dashboard and looger assambled in same part (fig. 5). It displays all the information required for on-track technical and support control.

Figura 5

On the MXL (pista) dashboard you can display various screens of data with the buttons located by the steering wheel and instrument panel.

Channels available to display:

Find below (fig.5 and 6) some examples of the channels available on the different screens. Your lap times will display on the dashboard of your Leon Super Cup (lap timer). SEAT Sport (in Spain) will place a master transmission beacon during the competition of the Super Cup SEAT León championship for the lap times SSp has available a customer transmiter like a spare part.

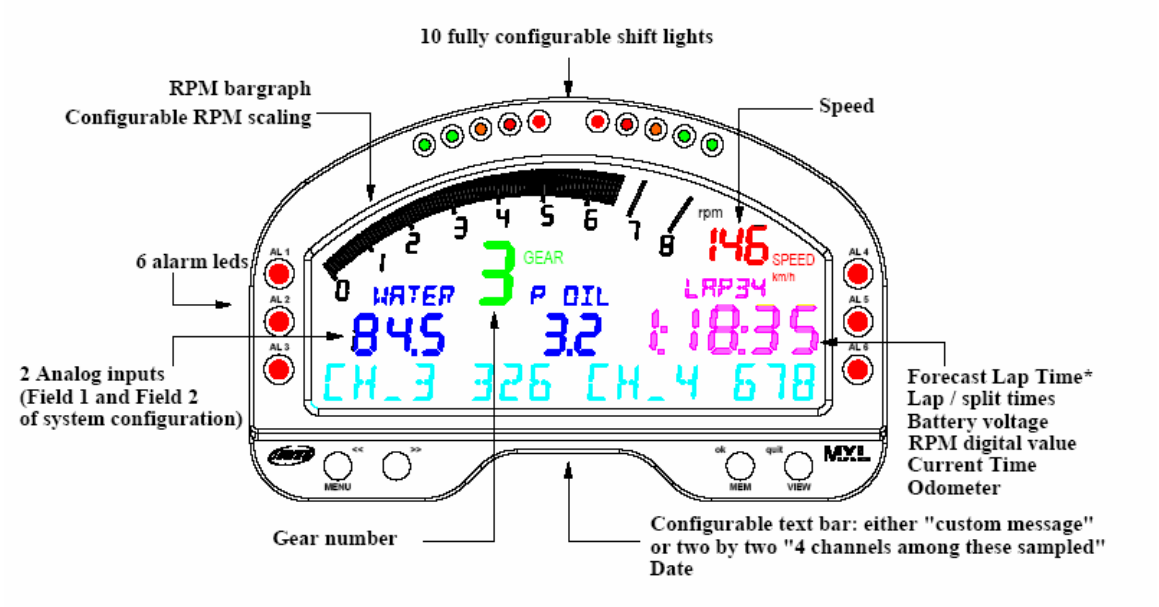


Fig. 6

Reconfigured channels and alarms

The preset channels (set by SEAT sport in the productions cars) that can be showed in the León Supercopa Mk2 dash board are the following ones:

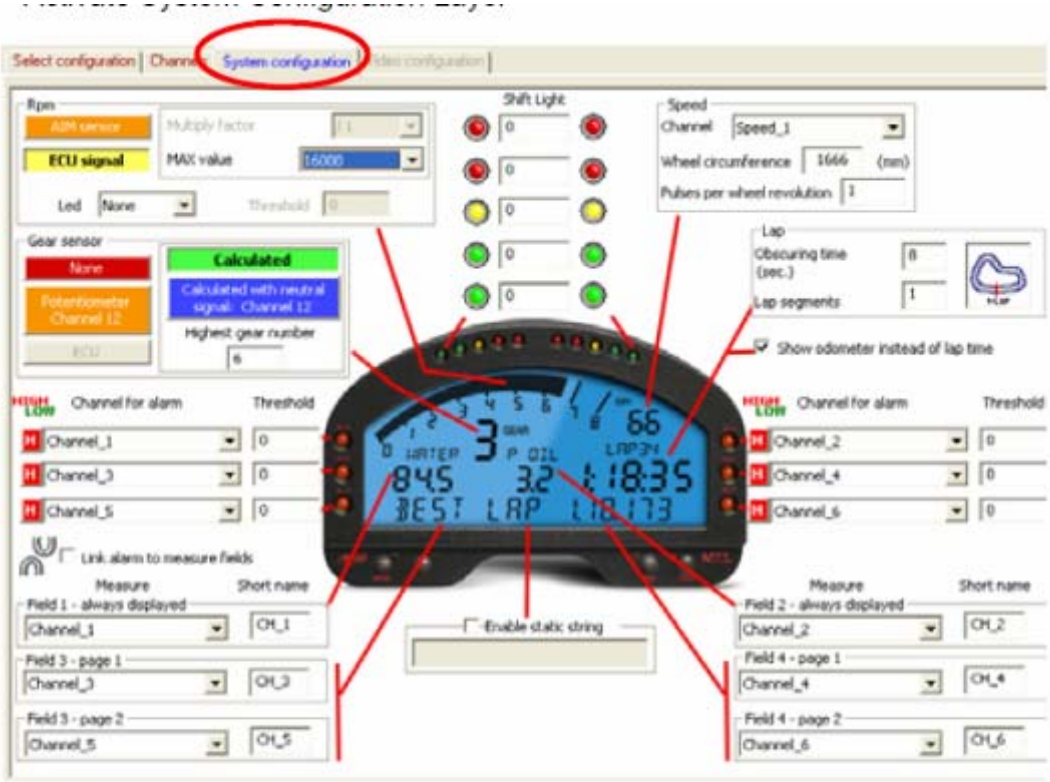
CHANELS:

- Water temperature
- Nº Gear
- Battery
- Fuel level
- RPM
- Oil press
- Front brake press
- Rear brake press
- Velocidad

ALARMS:

- Oil pressure.
- Water temperature
- Inlet air temperature
- Battery
- Fuel level
- Dash Failures

Next is shown a view of the PC screen for to configure the information to be showed in the Dashboard XML (figure 7). For more information use the AIM Manual, available in the Web: www.aim-sportline.com. All the updates of Software made by AIM are free and must be downloaded from Internet.



⇒ Set **RPM** box

⇒ Set **Gear Sensor** Box

⇒ Set **Channel for alarm** boxes and **Measure** Fields

⇒ Set **Enable Static string** box if you wish to use it

⇒ Set **Lap** box

⇒ Set **Speed** box

⇒ Set **Shift Lights** boxes

1.3.3 Data logger

This dashboard is also equipped with an integrated data capture system, through which you can download and analyse the data recorded in the memory using the "RACE STUDIO 2" and the "RACE STUDIO Analisis" program.

Technical specifications of the logger.

DATA LOGGER	IN CAR
BRAND	AIM
MODEL	MXL
MEMORY	3 Hours aprox. (8 Mb) Barrel
BEACON RECEIVER	YES
ERASE	YES
AVAILABLE CAN CHANNELS	25

AVALIABLE ANALOGIC CHANELS	8 Thru the auxiliary connector.
LICENCE	YES
SOFTWARE	YES
DOWNLOAD CABLE	YES
TRANSMITTER BEACON	Available in AIM catalogue. Available thru your AIM country distributor.

Note: To connect the additional analogic sensors must be done thru the auxiliary connector in the cockpit, in a dash board loom derivation. SEAT Sport gives the possibility to his costumers in the parts catalogue to request for a auxiliary connector loom (male connector with 2 metres free cables) .

The following list shows the available channels you can display on data analysis screens.

CHANNELS	COMMENTS
Battery	Battery voltage
Logger temp	Logger Temperature
RPM	Engine speed
Twater	Water temperature
Tair	Air temperature
Pedal	Accelerator pedal position
Throttle	Engine throttle
Pturbo	Turbo pressure
Toil	Oil temperature
Pfuel low	Fuel pressure
Pfuel High	High fuel pressure
Gear	Gear engaged
GBlever_pos	Gear lever position (steering demand)
GBlever_pos	Gear lever position (gearbox input)
Lambda	Riches exhaust gas
FL_Speed	FL wheel speed
FR_Speed	FR wheel speed
RL_Speed	RL wheel speed
RR_Speed	RR wheel speed
Fuel_level	Fuel tank gauge signal
Poil	Oil pressure

PbrakeF	Front brake pressure
PbrakeR	Rear brake pressure
Acc 1	Lateral G force
Distance	Distance channel

Next is shown a screen view from the data analysis.

- *Note GB lever-pos : This channel sown the action done through the shift pat and in witch gear box mode was running.

  The indications number in AIM adquisition data are the following:

  10: Shift pat Up pushed

  11= Shift pat Down pushed

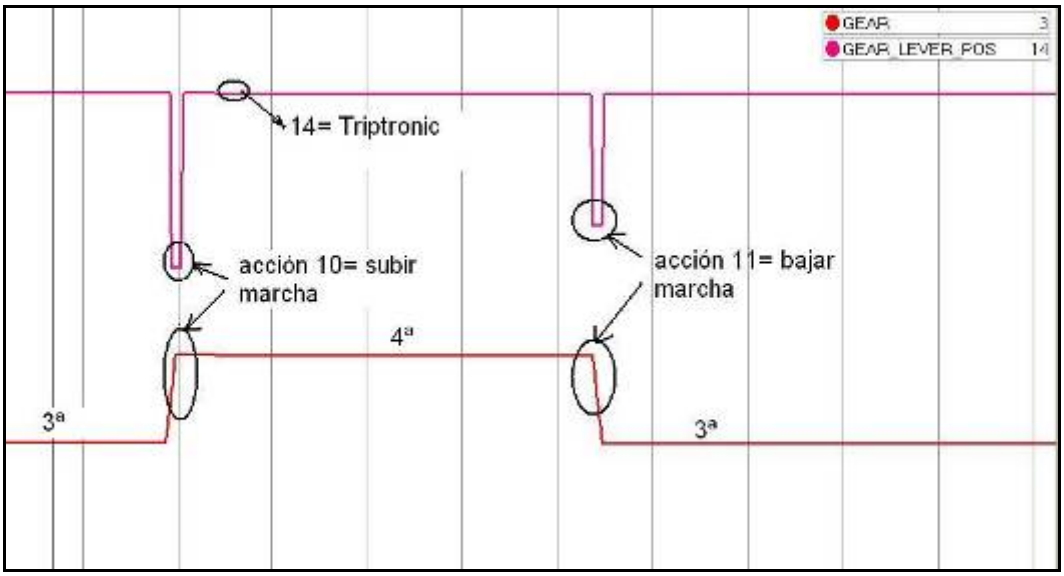
  12= When you run with Automatic **"S"**

  14= When you run with Triptronic **"T"**

  6 = Neutral

  8 = Reverse

Next is shown a sample more detailed from the shift pats action. When the right hand shift pat is pressed the value is 10 and when the left one the value is 11.



1.3.4 Driver console

Through the Driver control console is possible to run different components. Next are shown the controls:

The blinkers controls, clean-winscreen and light are managed like road car. The forced ventilation for the driver is trigged by pressing backwards the clean-windscreen pad .

1.4 Brake

The Leon Supercopa Mk2 have a independent brake line, front and rear with balance regulation through a mechanic system.

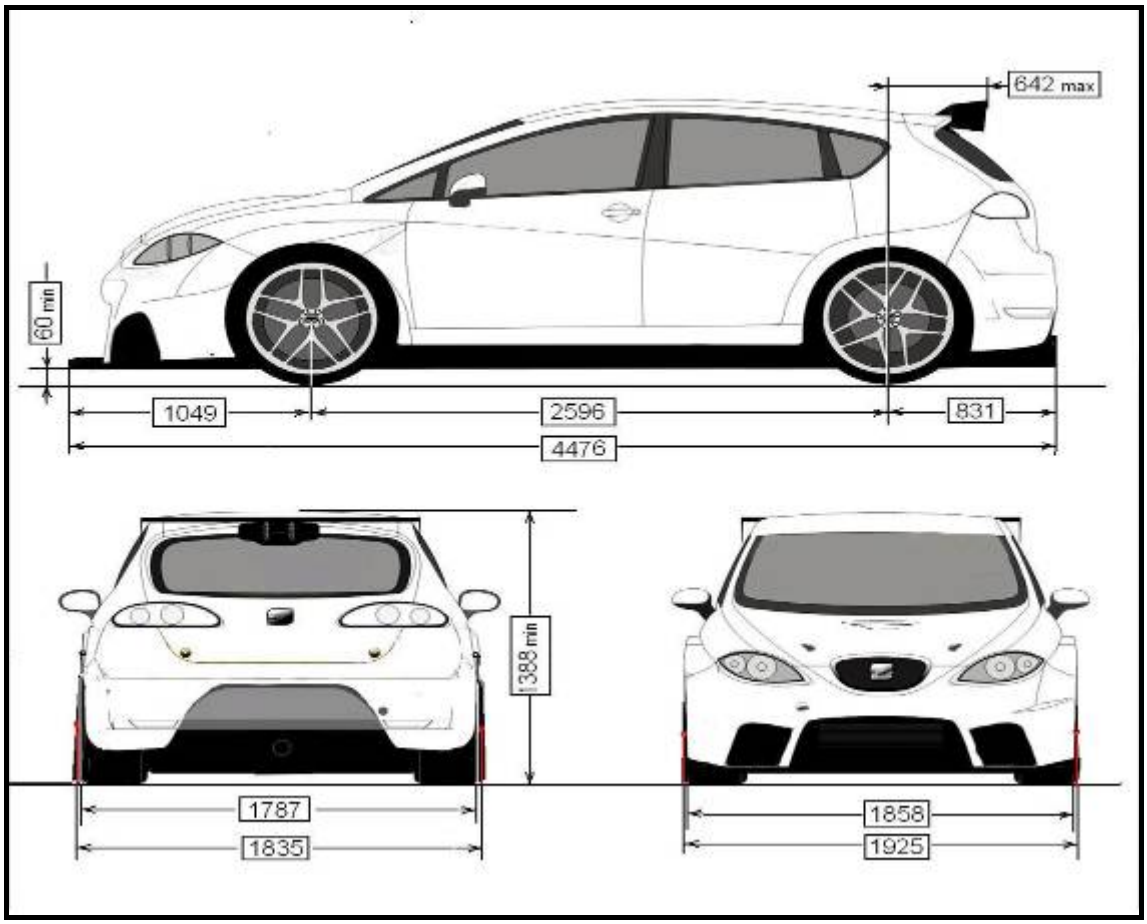
Following is shown a brake characteristic table.

PART	DESCRIPTION
Front calliper	**6 pistons**
Callipers material	**Aluminium**
Front disc ventiled	**362x32 mm**
Rear disc ventiled	**255x10 mm**
Brake balance	**Mechanical,**
Ventilation forced	**Yes, Pipe Ø 102mm.**
Brake Pumps	**Posibilities according the parts catalogue**

The León Supercopa is equipped with a semi-automatic gearbox DSG and a turbo engine. This combination means that the car speed decrease require a brake demand more high, and for this reason is very recommendable to pay attention on the point 2.5 Brake Maintenance and Service.

1.5 **Chassis**

Descripción	Description	Medida Dimension	Notas / Notes
Longitud máxima	Overall length	4476 mm	
Ancho carrocería anterior máximo	Overall bodywork front width	1858	**Measured on the mudward front axle**
Ancho carrocería posterior máximo	Overall bodywork rear width	1787	**Measured on the mudward at the rear axle**
Batalla	Wheel base	2596 mm	
Voladizo anterior	Over hang front	1049 mm	
Voladizo posterior	Over hang rear	831 mm	
Voladizo ala posterior	Over hang rear wing	642 mm	
Ancho máximo eje delantero	Front axle maximum width	925	**At the outside wheel center at 6º camber**
Ancho máximo eje trasero	Rear axle maximum width	1835	**With 10mm spacer and 6º camber**
Altura mínima carrocería	Minimum body work height	1388 mm	
Altura mínima fondo plano	Minimum ground clearance	60 mm	



1.6 **Body shell**

The Leon Super Cup Mk2 chassis is a special version. It has been structurally reinforced with a safety roll cage, designed and manufactured at SEAT Sport, S.A.

Below find a drawing of the Leon Cup Mk2 safety cage designed and manufactured by SEAT Sport with homologation No. **HES2001205.** Fig. 7.

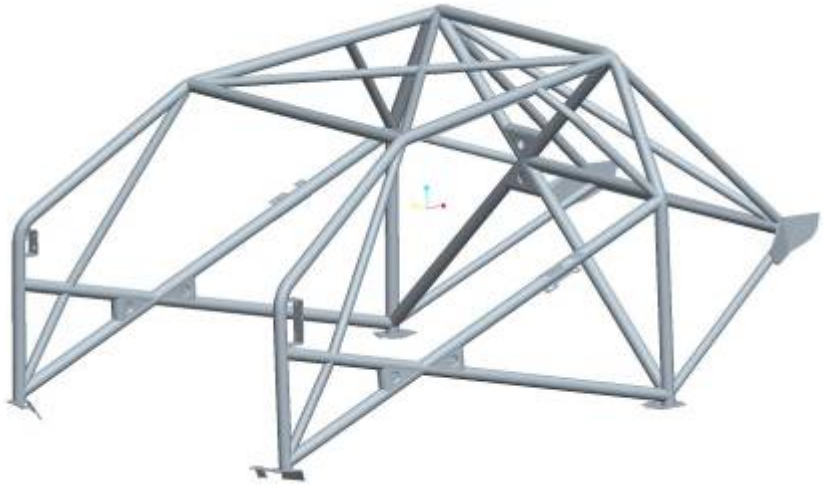


Fig. 7

This drawing (Fig. 8) shows the position of the driver in the car. This further-back position improves the weight distribution.

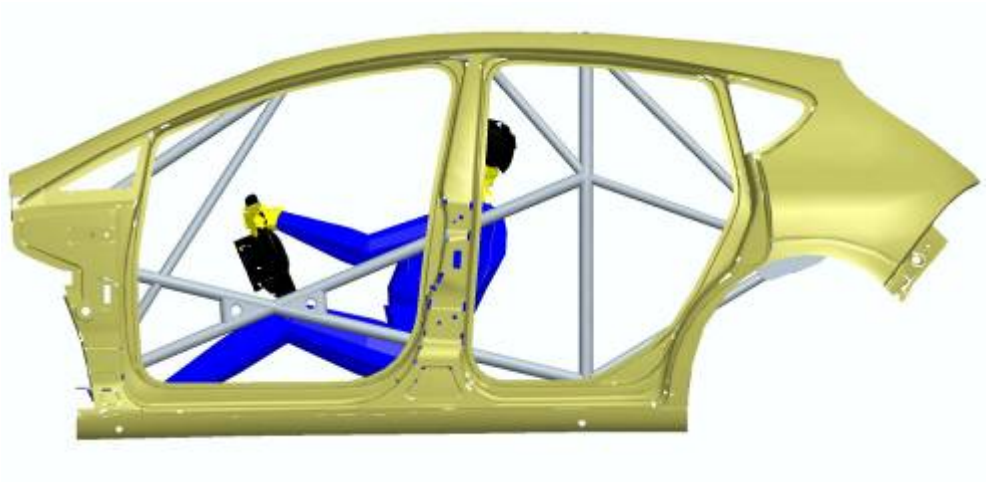
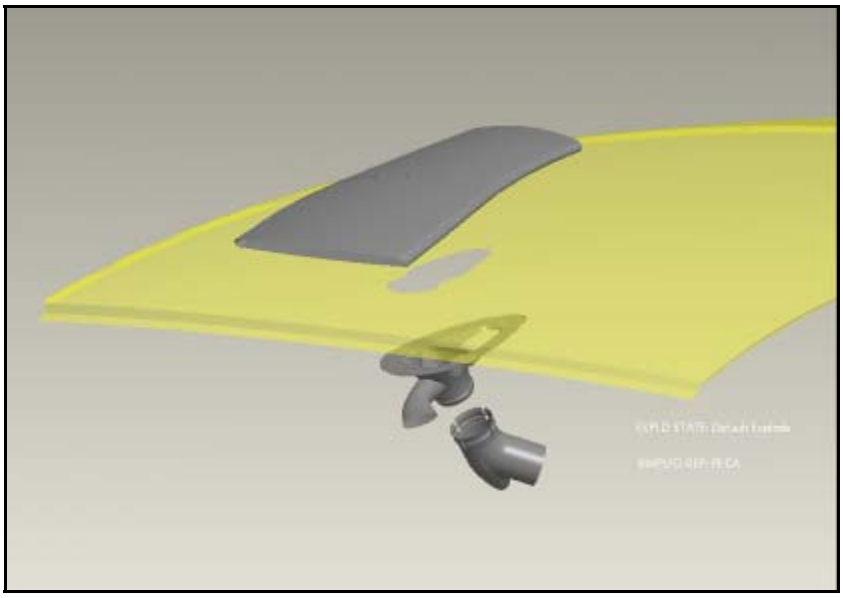


Fig. 8

Next is shown the roof air intake. This air duct also works taking off the hot inside air through its rear side using the vacuum formed in that part.



Flat Bottom: It's recommendable to disassemble and clean periodically this part.

2 FINE-TUNING

Find next the information to set-up the Leon Super Cup Mk2.

2.1 Tyre information

The SEAT León Supecopa has being developed to use the (in 2008) the 9,5" rims and tyres 245/650 R18 until 265/645 R18. It's advisible to consider the preasures conditions are:

Cold : 1.5 bar mínimum

Hot: between 2.2 and 2.4 bars.

2.2 **Recommended car set-up.**

Front axle	Value
Height from the ground	65 mm from the lowest point
Camber	-4.30°
Toe	-0°10' OUT
Spring/mounting length	160/60/90+ 60/60/2 Lm=174 mm Bump stop washer 5mm
Anti-Roll Bar	Medium – Medium
Shock absorber	C6 / E450 º (1¼ turns)

Rear axle	Value
Camber	-4°
Toe	0°
Spring	160/60/60+ 60/60/2 Lm= 200 mm
Anti-Roll Bar	Medium – Medium
Damper	C7 / E5 (5 holes)
Rear wing	0º

These are guidelines to start set-up in any circuit.

2.3 **Front axle adjustments**

Next below are the specifications of the front axle in the preset configuration:

Front axle	Value
Compression stroke	50 mm
rebound stroke	50 mm
Natural frequency	2.85 Hz
Natural frequency with tyre	2.34 Hz
Stiffness of the anti-roll bar B-B to D-D	360 to 723 Nm/ºchassis
Anti-roll stiffness	3325 Nm/ºchassis
Critical damping coefficient (Ccr)	11010 N/(m/s)
Extension damping ratio (ξ)	0.22
Compression damping ratio (ξ)	0,62

Complete vehicle	Value
Initial roll sensitivity	0.77 º/G
Front initial roll moment	4733 Nm
Rear initial roll moment	1828 Nm

2.3.1 Adjustments of the suspension geometry

When lining up the front axle, mind that the front sub-frame allows a certain amount of play in both directions. Consequently, it is advisable to begin with the wishbones in equal positions (Fig. 9). To achieve this, loosen the tie rod of the sub-frame to the gearbox.

The wishbone can adjust the camber by changes of ± 30'. Once the suitable position is achieved, mark it for repositioning after check-ups.

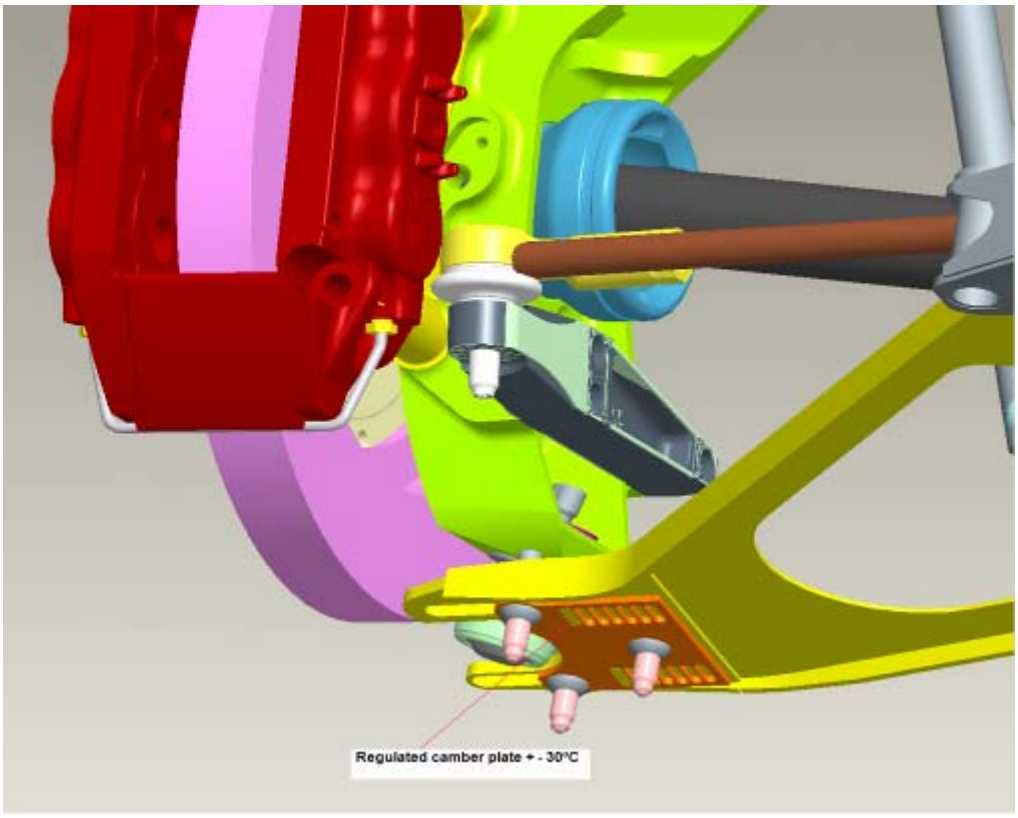


Fig. 9

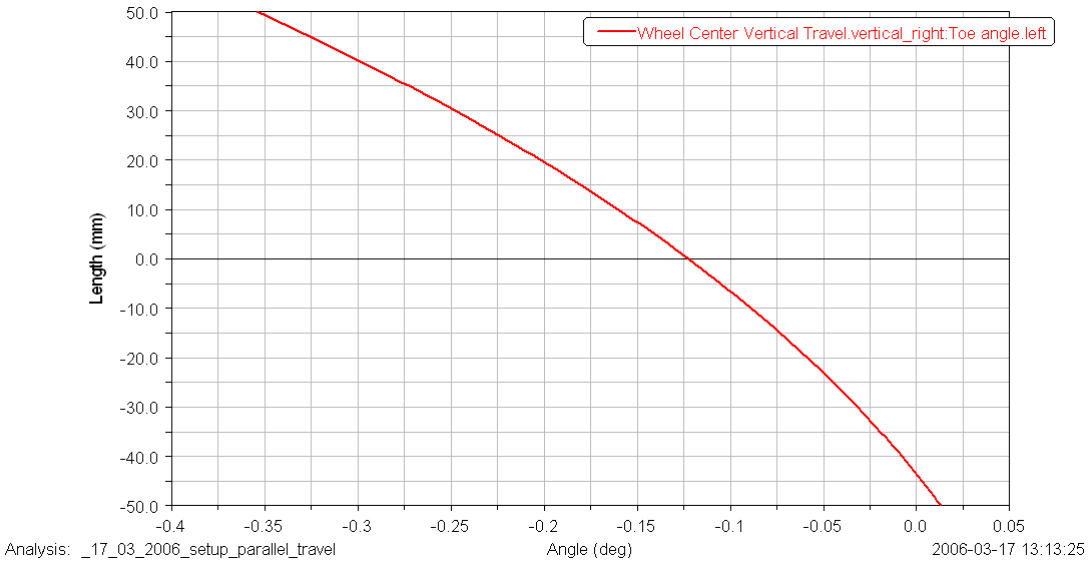
Under no circumstances should you place a wheel spacer on the front axle.

The following graphs use the following sign criteria:

- Shock absorber length movement + compression and – rebound (negative value).
- Toe + closed (toe in) – open (toe out).

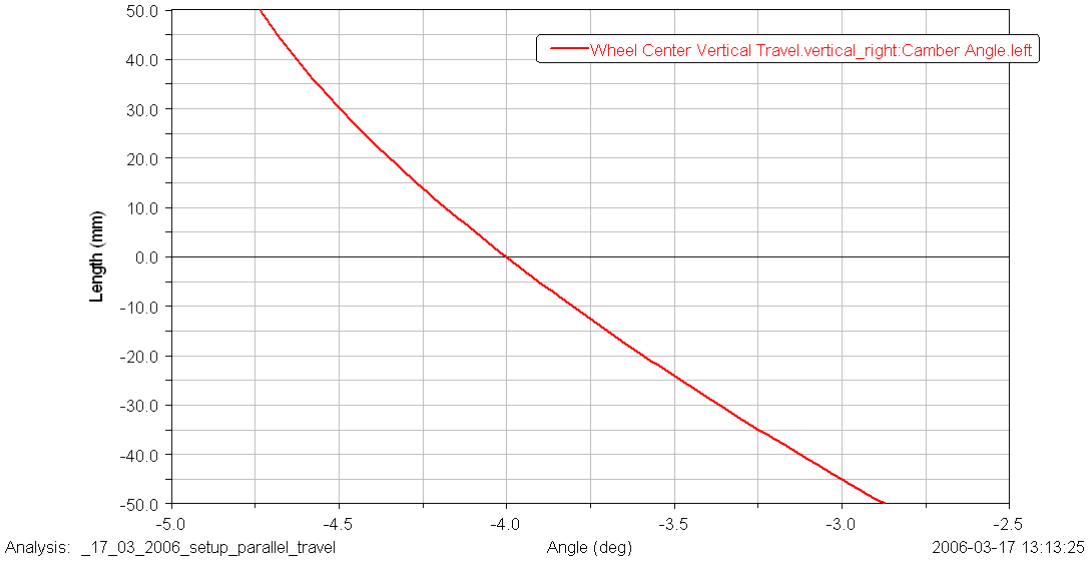
Vertical movement of a wheel

Graph 2. Bump steer, i.e. the toe variation compared to the vertical movement of the wheel.



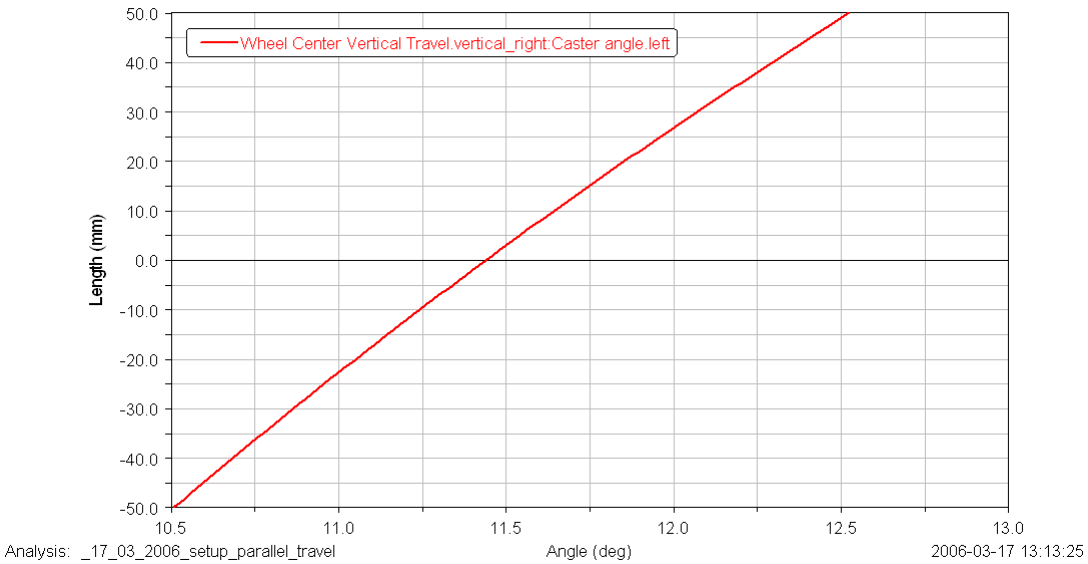
Graph 2

Graph 3: Variation of the camber angle of the wheel due to his vertical movement .



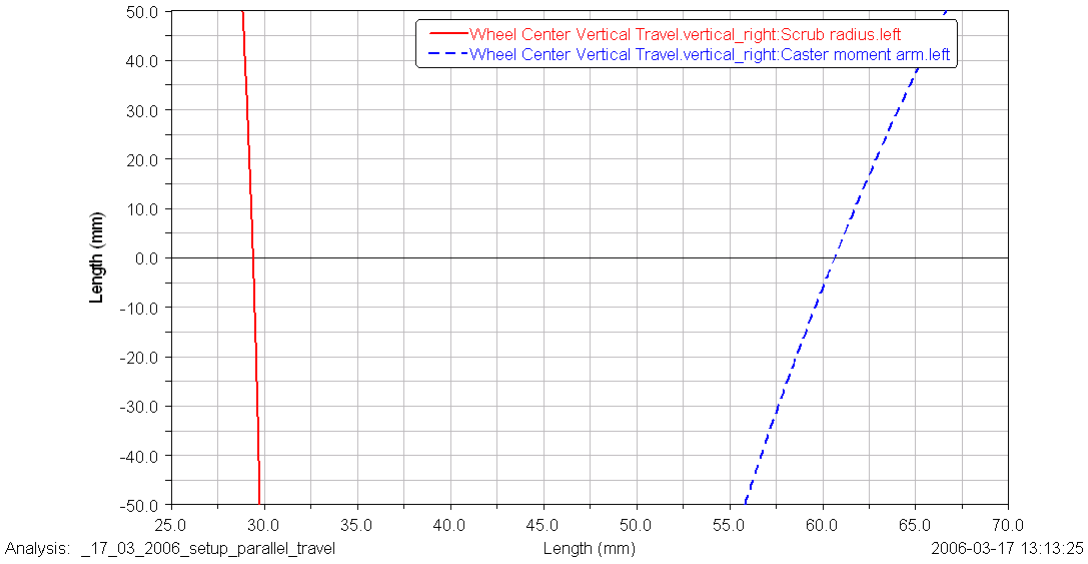
Graph 3

Graph 4: Variation of the caster angle.



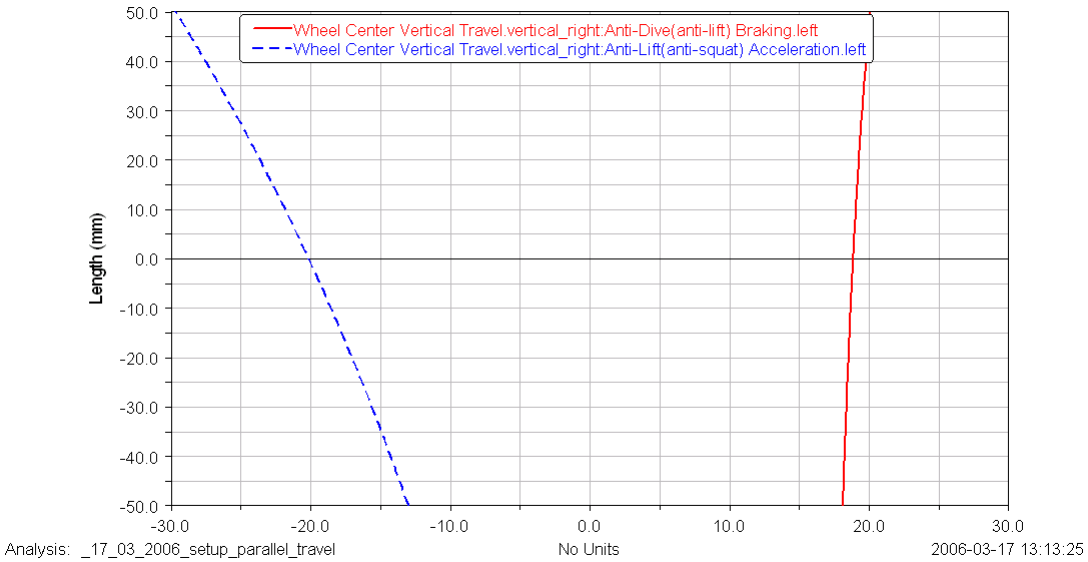
Graph 4

Graph 5: Suspension scrub radius. Scrub radius and caster moment arm.



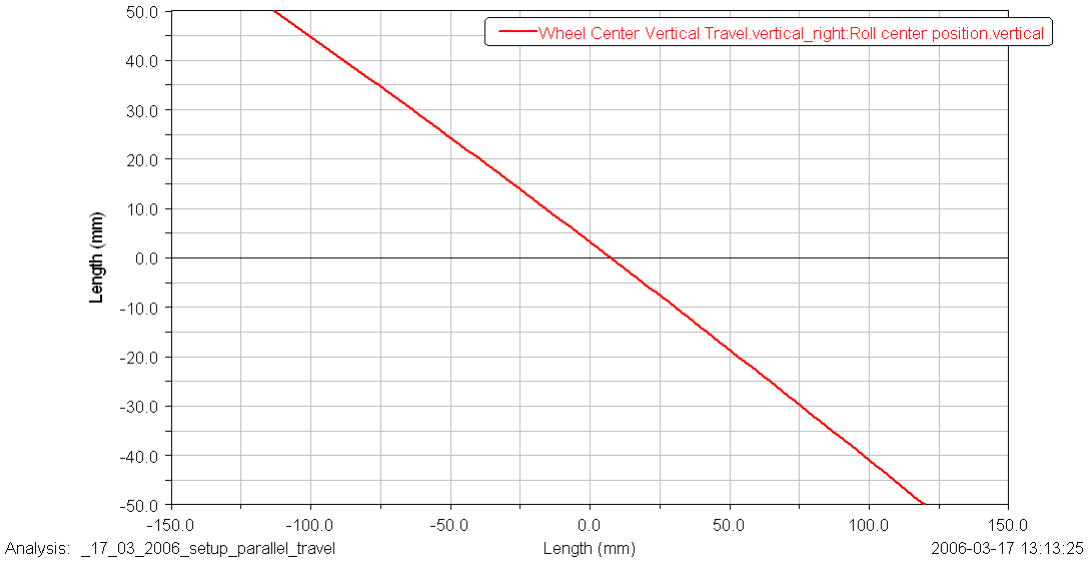
Graph 5

Graph 6: Anti-dive and anti-lift vs. the vertical movement of the wheel.



Graph 6

Graph 7: Position of the roll centre



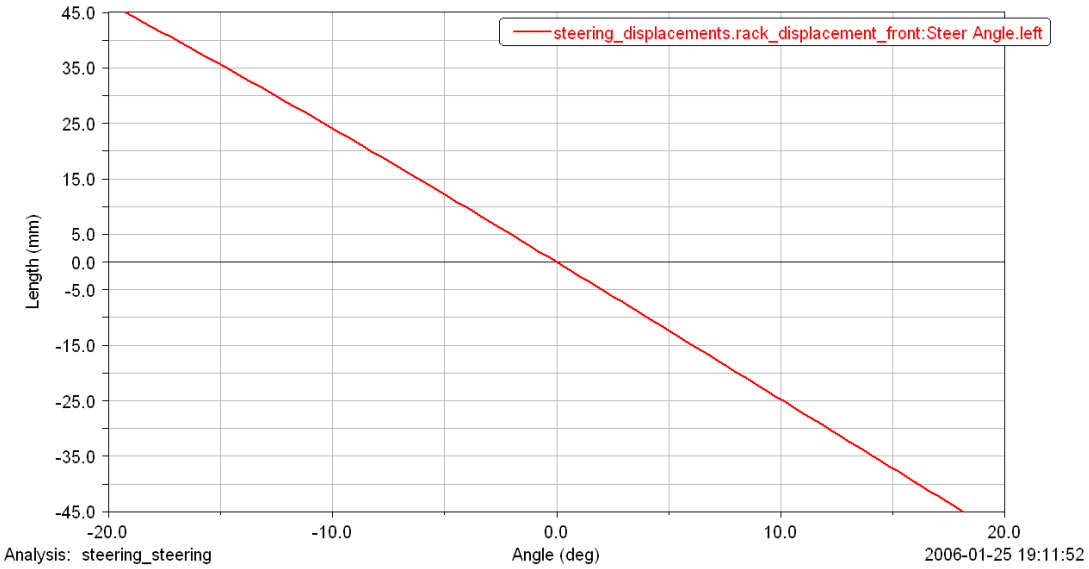
Graph 7

2.3.2 Steering

The SEAT Leon Mk2 steering geometry is adjustable only in toe.
The sweep is limited by two 30-mm steering rack spacers.

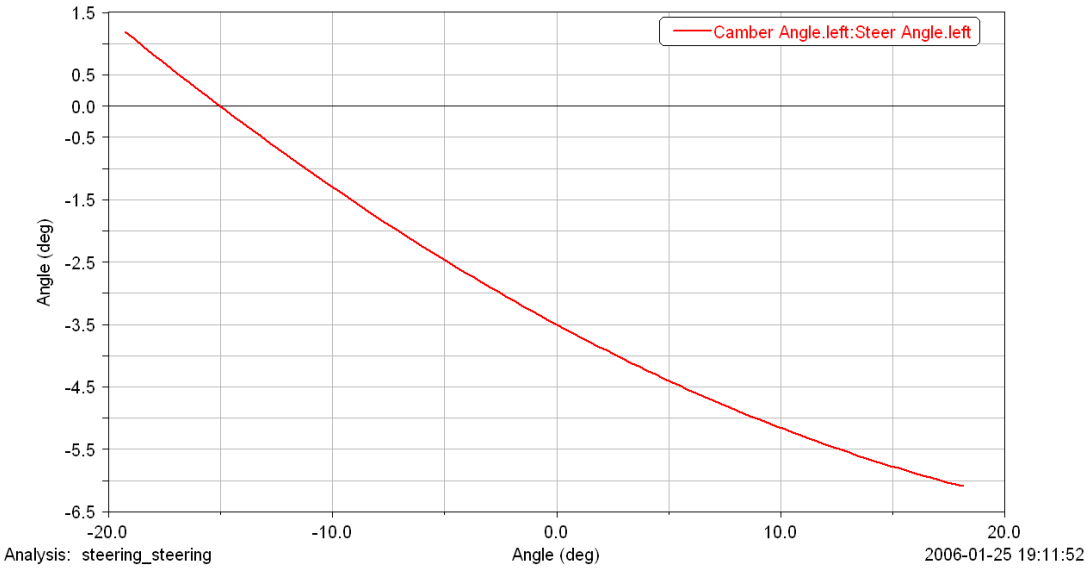
The SEAT sport catalogue lists a tool (reference U4PT 400 015) for centring the steering rack travel. To carry out the toe verification, the steering wheel must be locked against that tool.

Graph 8: Wheel steer angle vs. rack displacement



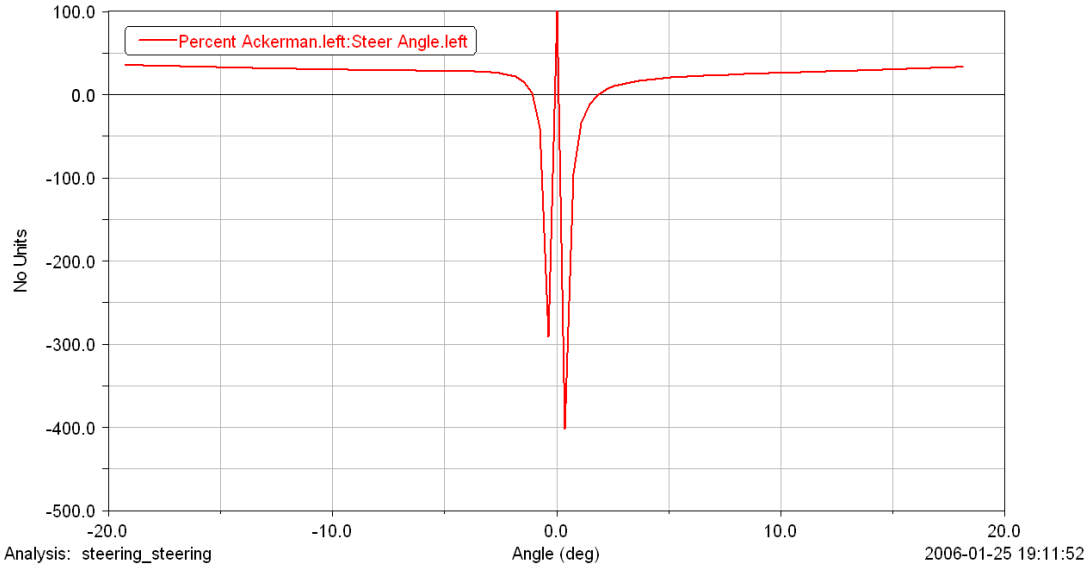
Graph 8

Graph 9: Camber change according to wheel steer angle



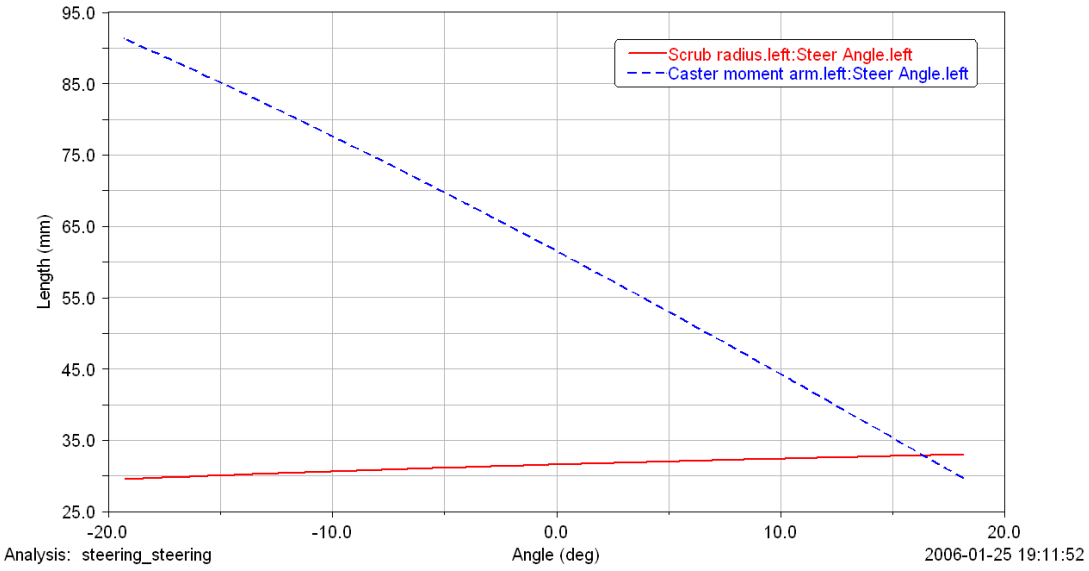
Graph 9

Graph 10: Variation of the Ackerman percentage due to the wheel steer. (30%)



Graph 10

Graph 11: Variation of the scrub radius and the caster moment arm due to the wheel steer angle.



Graph 11

2.3.3 Springs

The following springs can be mounted in the front or in the rear axle, recomending the firs 5 to the rear axle and the 4 last to the rear:

Referencia	Muelles delanteros
VN0020065100	160-60-50
VN0020065200	**160-60-60**
VN0020065300	160-60-70
VN0020065400	160-60-80
VN0020065500	**160-60-90**
VN0020065600	160-60-100
VN0020065700	160-60-110
VN0020065900	160-60-130

All these springs are mounted with a 60-60-2 helper spring with a VN0020018100 key**.**

The car is supplied from the factory with the intermediate option and the optional springs may be ordered to SEAT Sport S.A.

The following spring can only be mounted in the front axle, and with out helper spring.

Referencia	Muelles delanteros
VN0020011500	250-60-70

2.3.4 Ground clearance

The minimum chassis height is 60 mm from the lowest part of the vehicle. This part corresponds to the flat-bottom chassis pan.

This height, in the scrutinering measurtements is 60 mm, ground to the chasis must be measured in 'running condition', i.e. at any point of the flat pan (Fig. 10) under any condition of the vehicle (petrol, brake pads, liquids etc.) and with the driver in position.

Take care when you will set the height of the car on how much petrol you have in both sides of your petrol cell, because when you refuel from empty, the 20 first litres may stay at the same side of the fuelling hose. It's advisable to check the height of the car with empty fuel cell ballasting it like you decide.

Following it's showed the bottom part of the León Supercopa Mk2 flat bottom.

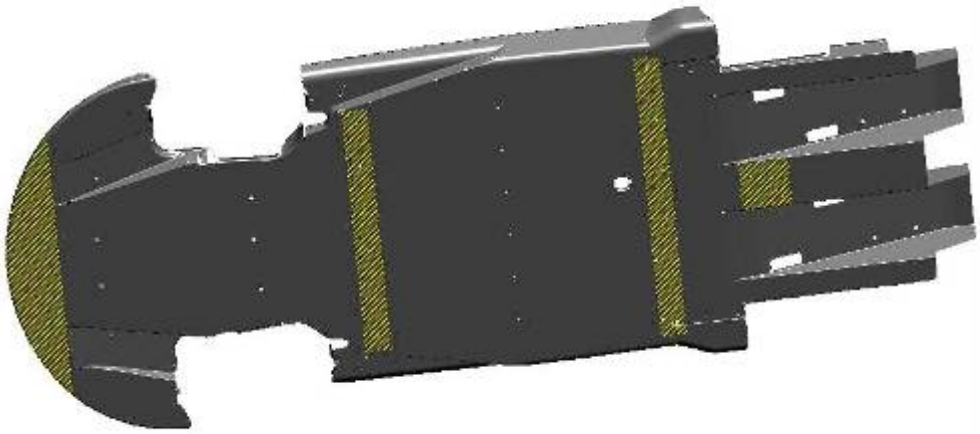


Fig. 10

The assembly length is the distance between the external faces of the springs fitted on the extended shock absorbers.

The necessary mounting lengths to obtain the reference height for the spring possibilities are shown below.

Spring combinations	Mounting length
250-60-70	238 mm
160-60-90 + 60-60-2	174 mm
160-60-100 + 60-60-2	178 mm
160-60- 110 + 60-60-2	181 mm
160-60-130 + 60-60-2	185 mm

The ratio between the spring and the wheel may be considered almost one (0.95), which means that a mounting length variation of a certain amount has a repercussion of a similar amount in the variation of the vehicle height.

To avoid spring block it is necessary to set up the ride height by adding or extracting the spacers as shown in the figure. The "top compression elastomer" V4PL413133 must be always mounted

Spring combinations	Mounting length	Car heighth	Bump stop package
250-60-70	238 mm	60mm to 80mm	Bump stop
160-60-90 + 60-60-2	174 mm	60 mm	Bump stop + Bump spacer (5mm)
	174 to 169 mm	65 mm	Bump stop + 2x Bump spacer (5mm)
	169 to 164 mm	70 mm	Bump stop + 3x Bump spacer (5mm)
	164 to 159 mm	75 mm	Bump stop + 4x Bump spacer (5mm)
160-60- 110 + 60-60-2	181 mm	60 mm	Bump stop + Bump spacer (5mm)
	181 to 176 mm	65 mm	Bump stop + 2x Bump spacer (5mm)
	176 to 171 mm	70 mm	Bump stop + 3x Bump spacer (5mm)
	171 to 166 mm	75 mm	Bump stop + 4x Bump spacer (5mm)
160-60-130 + 60-60-2	185 mm	60 mm	Bump stop + Bump spacer (5mm)
	185 to 180 mm	65 mm	Bump stop + 2x Bump spacer (5mm)
	180 to 175 mm	70 mm	Bump stop + 3x Bump spacer (5mm)
	175 to 170	75 mm	Bump stop + 4x Bump spacer (5mm)

Reference	Description

V4PL 413 133	Bump stop 20 mm
V4PL 413 139	Bump spacer 5 mm

Bump stop will be assembled in this position (cone up) , then you can slide the bump stop up to the top.

Bump spacer will be always assembled on the bottom (see picture).

2.3.5 Anti-Roll Bar

The León Super Cup Mk2 has a 25x2 anti-roll bar with six adjustable positions that can be changed using two rods, the left one of which is adjustable.

Disconnecting the anti-roll bar is considered a possible setting. This can be disconnected by either of the one ends. The rod disconnected must extracted from the car.

Vertical stiffness

The vertical stiffness per wheel produced by the front anti-roll bar is the following:

Position	Value
Soft-Soft	15 N/mm
Soft-Medium	20 N/mm
Medium-Medium	25 N/mm
Medium-Hard	30 N/mm
Hard-Hard	35 N/mm

Anti-roll stiffness

The anti-roll stiffness per wheel produced by the front anti-roll bar is as follows:

Position	Value
Soft-Soft	361 Nm/º chassis
Soft-Medium	462 Nm/º chassis
Medium-Medium	603 Nm/º chassis
Medium-Hard	723 Nm/º chassis
Hard-Hard	844 Nm/º chassis

2.3.6 Front shock absorbers

The front shock absorbers are specific to the SEAT Leon Mk 2 and the official supplier is KONI.

Adjustment of the front shock absorber

The shock absorber is adjustable in two ways, hydraulic extension and compression.

The adjuster of the extension is located at the top end of the axle trough an flat head. On the drawing, it is marked with the letter “B”.

The compression adjustment is done trough the scru at the downof the body shock.

This is marked with the letter “A” in Figure 11.

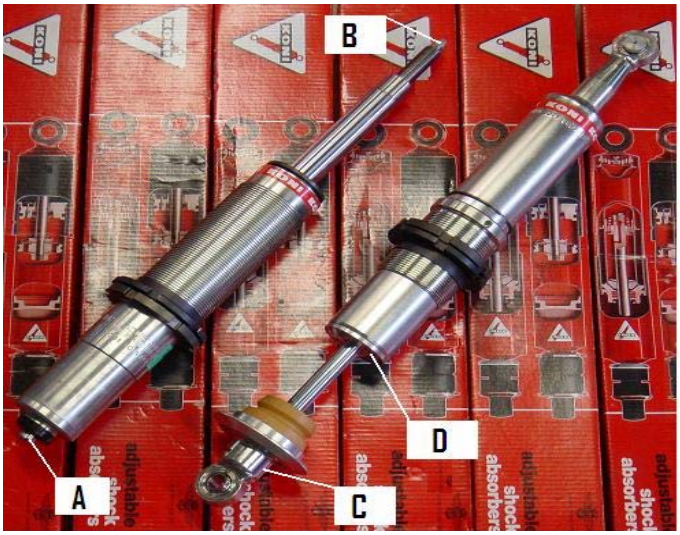


Fig. 11

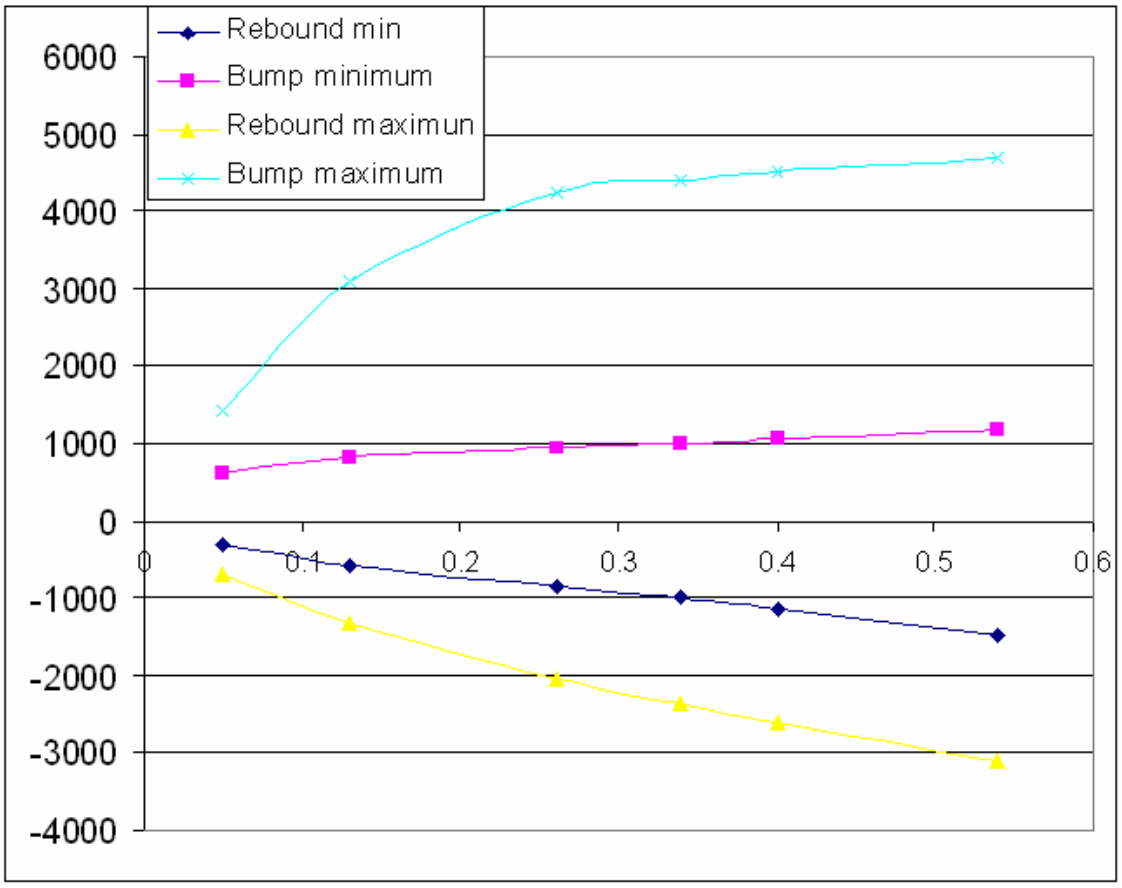
***Compression* (A):** The compression has 12 adjustment positions.. Position 0 is the softest and clicks can be counted clockwise up to position 12 for the hardest (Fig 11)

***Extension* (B):** Turn clockwise to obtain a softer extension and anticlockwise to achieve the opposite effect. The adjustment is measured in degrees and has an infinite number of intermediate positions.

The extension can be adjusted using a tool (ref. U4PL413001) provided by SEAT Sport S.A. (Fig. 12).

Fig. 12

Graph 13: Graph of possible adjustments



2.4 Adjustments to the rear axle

Rear suspension specifications

Rear Axle	Value
Compression stroke	34 mm
Extension stroke	46 mm
Natural frequency	3.31 Hz
Natural frequency with tyre	3.14 Hz
Anti-roll stiffness	385 to 544 Nm/ºchassis
Total roll stiffness	2371 Nm/ºchassis
Critical damping coefficient (Ccr)	6686 N/(m/s)
Extension damping ratio (ξ)	0.42
Compression damping ratio (ξ)	0.34

2.4.1 Adjustments in the suspension geometry.

The rear suspension height, camber and toe can be adjusted.

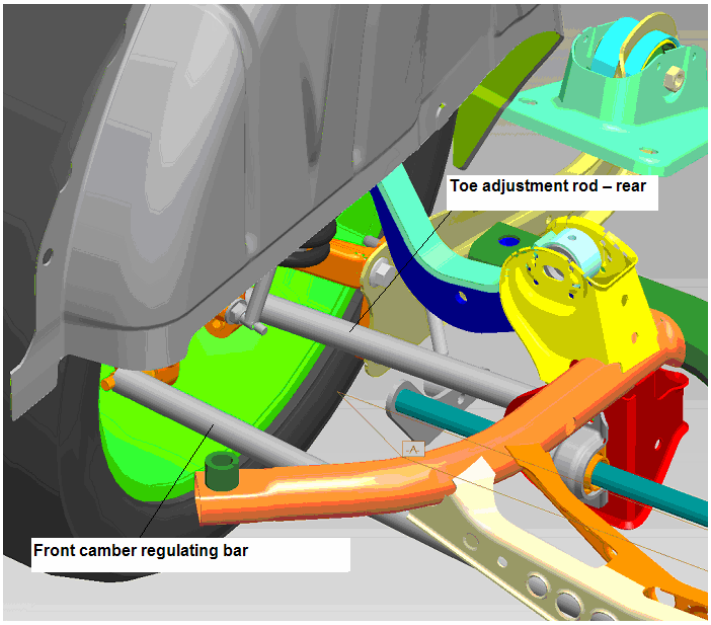


Fig. 14

Camber and toe trough the ball joints and the transverse tie rods. Loosen the sub-frame and move it trough it's play to equalize the toe of both wheels before starting to move the ball joints.

The leght of the rear tie rod (front adjustment bar Fig. 14) must be regulated trough the ball joint to obtain the necessary camber, then come back to the desired toe with the front tie rod. For example:

- initial position: toe 0º camber –3º40´
- In tie rod one turn: toe 0º 44´ camber –3º03´
- Out tie rod one turn: toe –0º 42´ camber –4º 30´.

The leght of the front tie rod (rear adjustment bar Fig. 14) must be regulated trough the ball joint to obtain the configuration of the necessary toe. For example:

- initial position: toe 0º camber –3º40´
- in tie rod one turn: toe –0º 48´ camber –3º 47´).
- out tie rod one turn: toe 0º 48´ camber –3º52´ ,

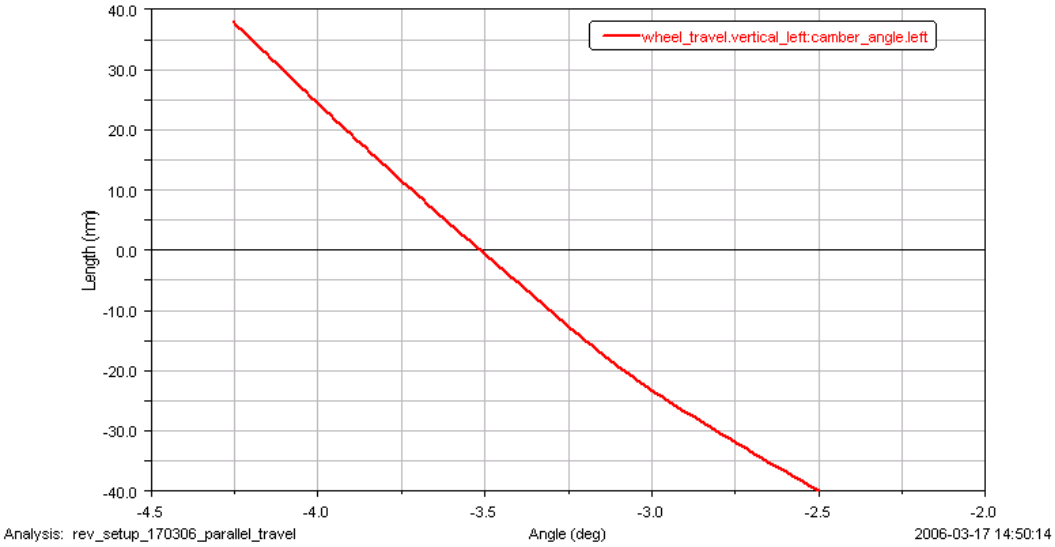
(Meaning of signs + closed (toe in) – open (toe out)).

For the standard 3º30' regulation and the 0º toe, the lengths of the bars are as follows:

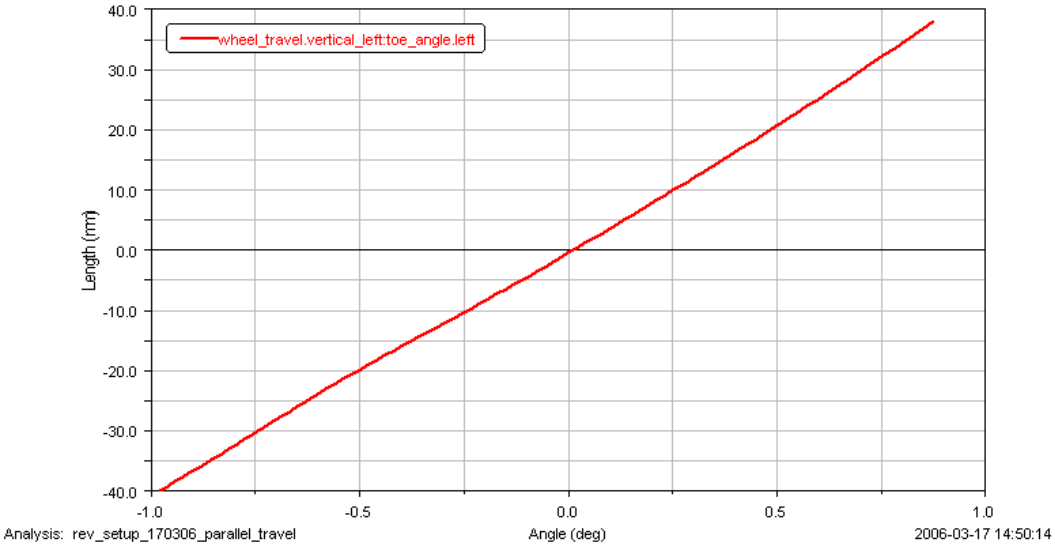
Front adjustment tie rod = 300.5 mm

Rear adjustment tie rod = 595 mm

Graphs 13-14: Camber and toe variation of the rear axle with standard adjustments



Graph 13

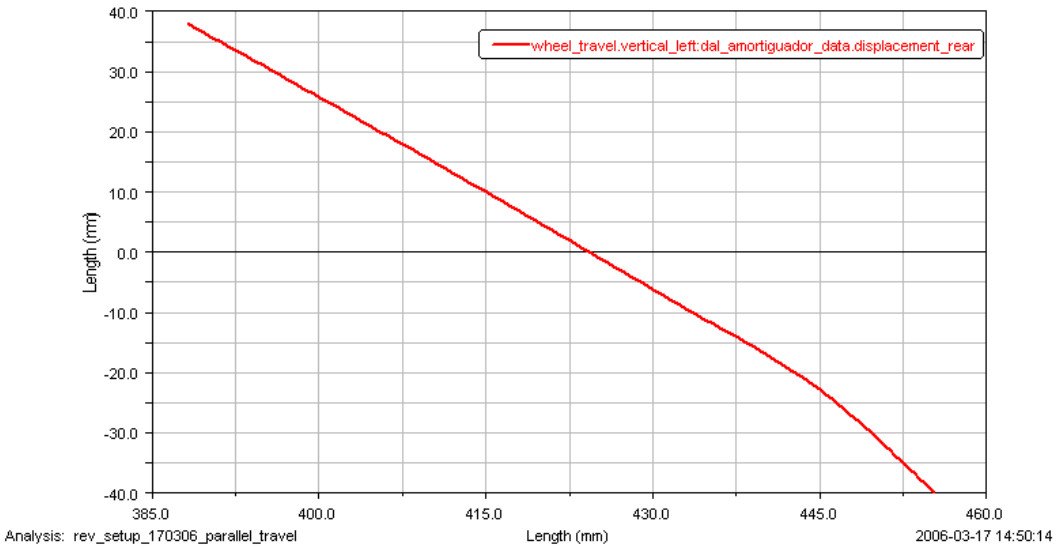


Graph 14

These graphs can be extrapolated for any near standard adjustment, since they only involve horizontal displacements of the graph.

The shock absorber is not placed directly on a point near the wheel centre, also being slightly inclined.

Graph 15: Wheel displacement ratio vs. shock absorber



Graph 15

In accordance with these graphs, an almost constant shock absorber displacement ratio can be used for basic calculations. These coefficients are as follows:

Ratios	Value
$K_{WHEEL/DAMPER}$	0,95

In the vehicle could be installed one 10 mm spacer per rear wheel on the rear axel (2008 cars supplied without). A set up with or with out this 10mm spacer is possible only on the rear axel.

Reference	Thickness
V4PT 419 610 D	10 mm

2.4.2 Springs.

The following springs can be mounted in the front or in the rear axle, recomending the firs 5 to the rear axle and the 4 last to the rear:

Referencia	Muelles delanteros
VN0020065100	**160-60-50**
VN0020065200	160-60-60
VN0020065300	**160-60-70**
VN0020065400	**160-60-80**
VN0020065500	160-60-90
VN0020065600	**160-60-100**
VN0020065700	**160-60-110**
VN0020065900	**160-60-130**

The car is fitted from the factory with the intermediate option plus the 60-60-2 helper and the optional springs are available from SEAT Sport, S.A.

2.4.3 Ground clearance

Ground clearance is measured from the flat-bottom chassis pan and must be 60 mm.

The assembly length is the distance between the external faces of the springs fitted on the extended shock absorbers.

To maintain this height, the following assembly lengths are offered for the different springs:

* Measures taken without driver and with 40 liters of gasoline.

Rear springs	Lm
160-60-50 + 60/60/2	187 mm
160-60-60+ 60/60/2	193 mm
160-60-70 + 60/60/2	197 mm
160-60-80 + 60/60/2	201 mm

2.4.4 Rear anti-roll bar

The León Super Cup Mk2 has a 20x6 anti-roll bar with six adjustable positions that can be changed using two rods, the left one of which is adjustable.

Disconnecting the anti-roll bar at one end is considered like a possible setting. This can be disconnected by either of the two ends. The rod must remain fixed in such a way that it does not interfere with any part of the bodywork or suspension.

Vertical stiffness

The vertical and roll stiffness per wheel proportioned by the rear anti-roll bar is as follows:

Anti roll bar 20x6 (V4PL511407A)

Position	Value	Balance rigidity Nm/Xasis
Soft-soft	**17 N/mm**	**385**
Soft-Medium	**18.5 N/mm**	**419**
Medium-Medium	**20 N/mm**	**453**
Medium-Hard	**21.75 N/mm**	**493**
Hard-Hard	**23.5 N/mm**	**533**

Anti rol bar 22x5 (V4PL511407B)

Position	Value	Balance rigidity Nm/Xasis
Soft-soft	**24 N/mm**	**544**
Soft-Medium	**27,37 N/mm**	**620**
Medium-Medium	**30,74 N/mm**	**696**
Medium-Hard	**35,7 N/mm**	**808**
Hard-Hard	**40,66 N/mm**	**921**

2.4.5 Rear shock absorbers

The rear shock absorbers are specific for the SEAT Leon Supercopa and are officially supplied by KONI, model 3011-1150 SPORT, ref. SEAT Sport: V4PL513025.

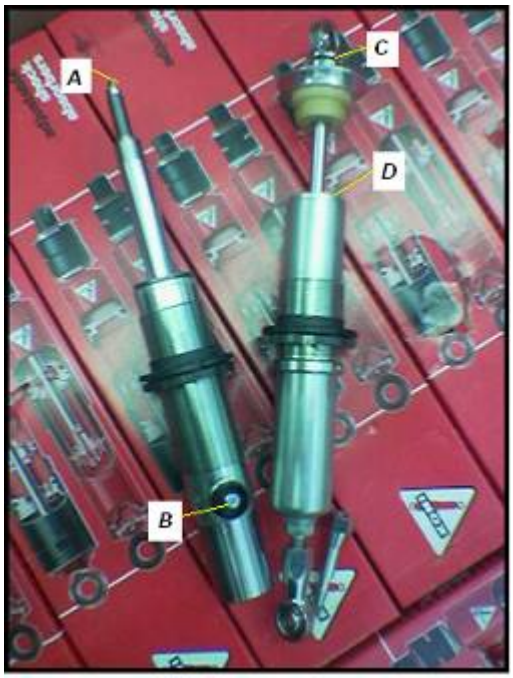


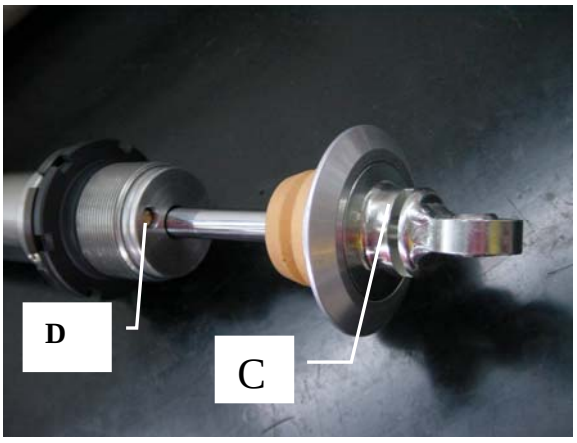
Fig. 15

Adjustment of the rear shock absorber

The shock absorber is adjustable in two ways: hydraulic rebound and compression.

The rebound adjuster is located at the end of the axle, inside the ball joint carrier. It is marked with the letter "C" on Figure 15.

The compression adjustment is regulated trough the button located in the shock absorber oil seal cap. It is marked with the letter "D" on figure 15.



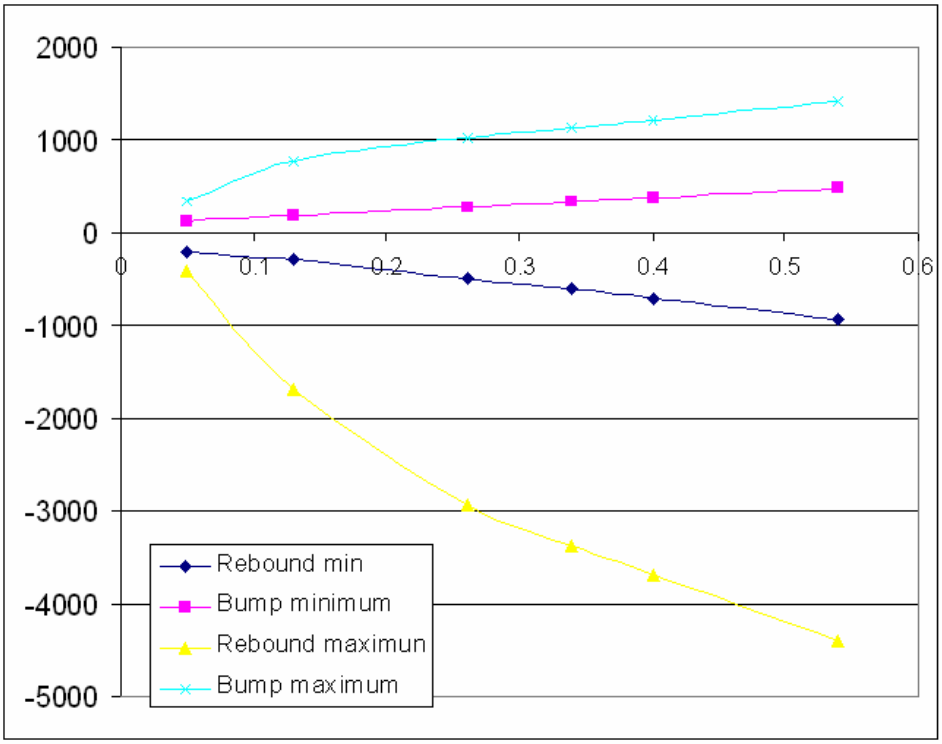
Blow-up Fig. 15

Compression. (**D)** (Fig. 15) The compression has 12 positions. Position 0 is the softest and it is adjusted by clicks trough the button of the shock absorber oil seal cap. To do this, the shock absorber must have the springs dismounted. With the shock absorber removed, press the click button and turn the shaft. Position 0 is the softest and clicks can be counted anticlockwise to stiffen the shock absorber.

Turn the rod for softer positions and for the opposite effect

Rebound. (C) Turn clockwise to obtain a softer rebound and anticlockwise to achieve the opposite effect. It is indicated on the shock absorber with + (hard) and - (soft).

Graph 16: Shock absorption



Graph 16

2.5 **Brakes.**

2.5.1 Brake balance

There are two different possibilities to regulate the brake balance.

- The first is turning right or left the hand wheel control that is in the cockpit located on the right of the driver side to balance the mechanical pump pushrod (with out pushing the brake pedal). You can see the changes done on the dash board information when breaking as from percentage and turning clockwise moves the braking regulation to the front wheels.

- The second is to change from the different brake pumps that you have in the Parts Catalogue.

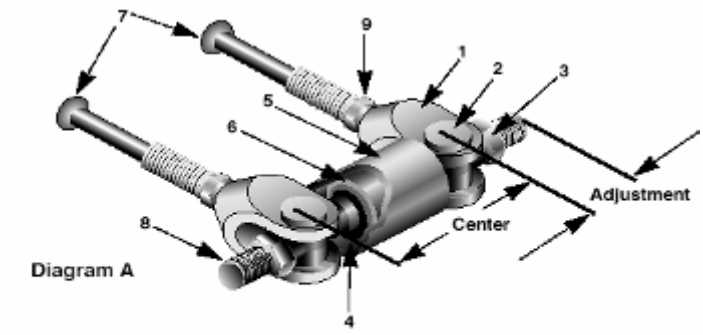


Diagram A

1. Clevis
2. Barrel Nuts
3. Jam Nuts
4. Retaining Ring Clips
5. Pivot Sleeve
6. Spherical Bearing
7. Pushrod
8. Adjusting Shaft
9. Jam Nuts (Pushrod)

The dimension “centre” must be between 62 mm < centre <63.5 mm , never more than 63.5 mm because in this case the clevis could make an interference with the brake pedal.

Please be careful to assembly the master cylinders in the way to achieve that the balance bar work completely perpendicular when you brake.

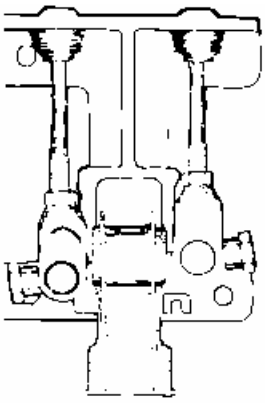


Diagram D
Pedal Relaxed

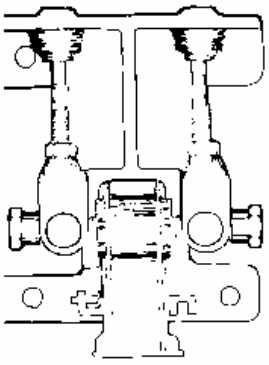


Diagram B
Pedal Depressed *(Correct)*

Apply the brakes and adjust the pushrod length so the adjusting shaft is parallel to the master cylinder mount (Diagram B). If one pushrod is shortened by one revolution, lengthen the other by one revolution and the pedal

position will not change. Do not extend the pushrods to the point where they preload the master cylinders. When satisfied with the pushrod adjustment, tighten both of the jam nuts on pushrods

The minimum bore of the master cylinder have the long dimension (see diagram D left) in this way when we push the pedal will be found de diagram B

Make sure the pushrods have no preload on them in the relaxed position. If this is

not done, the piston will be advanced in the master cylinder and block the fluid bleed-back hole. The brakes will drag if the bleed hole is blocked. As the race progresses, the fluid swells until the brakes lock-up.

Brake bleeding procedure

Priming Master Cylinder

1. Fill the master cylinder reservoir with brake fluid.
2. Open the bleed fitting at the master cylinder.
3. Gently depress and release the brake pedal until fluid emerges.
4. Select the bleeding order that fits your application

Brake bleeding order.

Brake Bleeding

1. Fill a clear bottle with enough brake fluid to keep the hose ends submerged.
2. Attach the other end of the plastic bleeder hose to the caliper bleedscrew.
3. Be sure the hoses stay submerged throughout the procedure to prevent sucking air on the return stroke of the pedal.
4. Depress the brake pedal with slow and gentle foot pressure.
5. Open the caliper bleedscrew.
6. Allow the pedal to drop to the fully depressed position.
7. Close the caliper bleedscrew.
8. Allow the pedal to return to the relaxed position.
9. Wait several seconds and then repeat step 4 through 8 until air has been removed from the system.

Brake bleeding order (both of the systems must be bled simultaneously) :

Front & rear passenger's side,

Front & rear driver's side,

After bleeding, minimal brake pedal travel should be observed. Properly bleeding the brakes does not require any power equipment or a massive amount of applied force.

2.5.2 Brake fluid

Please be careful to use always the same brake fluid , is very important to don´t make mixtures because these can make a wear in the seals.

In the case of change the mark of the brake fluid please be careful to don´t put Silicon based fluid because this type have a bad properties of :

-Long/spongy pedal
-Sudden loss of brake
-High air absorption
-High compressibility
-Wear of seals

Please try to put always brake fluids of type polyglycol ether and with high point of boil. (Motul 600 , AP 600 , AP 660).

2.5.3 Pumps.

The standard brake pumps of the SEAT Leon Super Cup Mk2 are shown in the Parts Catalogue.(on the left of the pedal when facing the front). Changing the pumps for others listed in the catalogue is allowed. It is, however, recommended not to have a greater pump internal diameter difference than 4 mm between front and rear.

The following is a list of the pumps available:

Reference	Internal diameter
V4PL614165	15.88 mm
V4PL614165A	17.78 mm
V4PL614165B	19.05 mm
V4PL614165C	20.64 mm
V4PL614165D	22.23 mm
V4PL614165E	23.81 mm

2.6 **Aerodynamics**

All the data shown have been obtained in a wind tunnel at full scale, which means that they are the empirical results for the real vehicle.

All the results were obtained with a standard height of 60 mm.

2.6.1 Front spoiler

The front spoiler is not adjustable neither in height nor depth. The front aerodynamic load can be adjusted by the chassis height at the rear axle.

2.6.2 Rear wing

The rear wing of the Leon Super Cup Mk2 is adjustable as far as the holes allow. The following table shows the different degrees of inclination that can be obtained from the different adjustment points. All the following data have been taken with a front and rear height of 60 mm.

Figure 16: Aileron positions

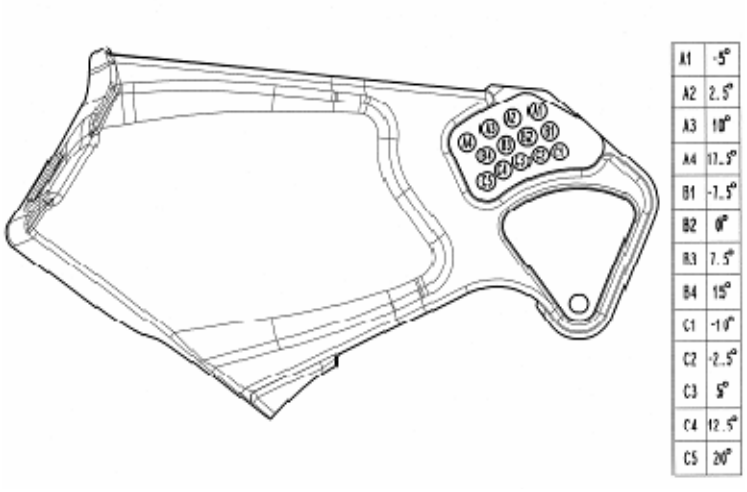
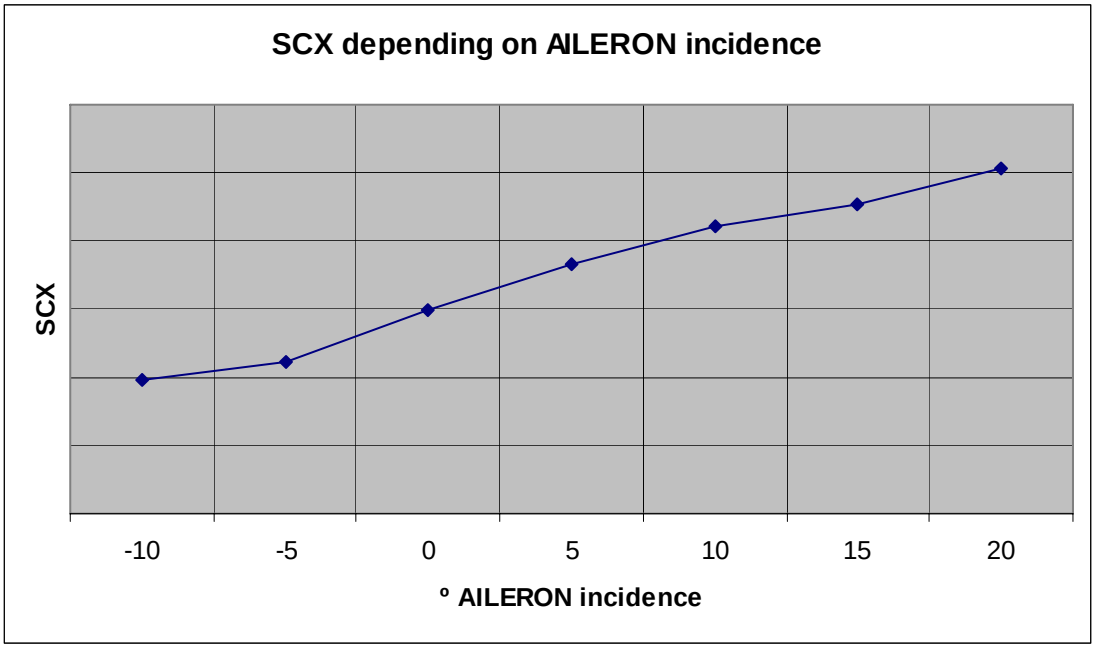


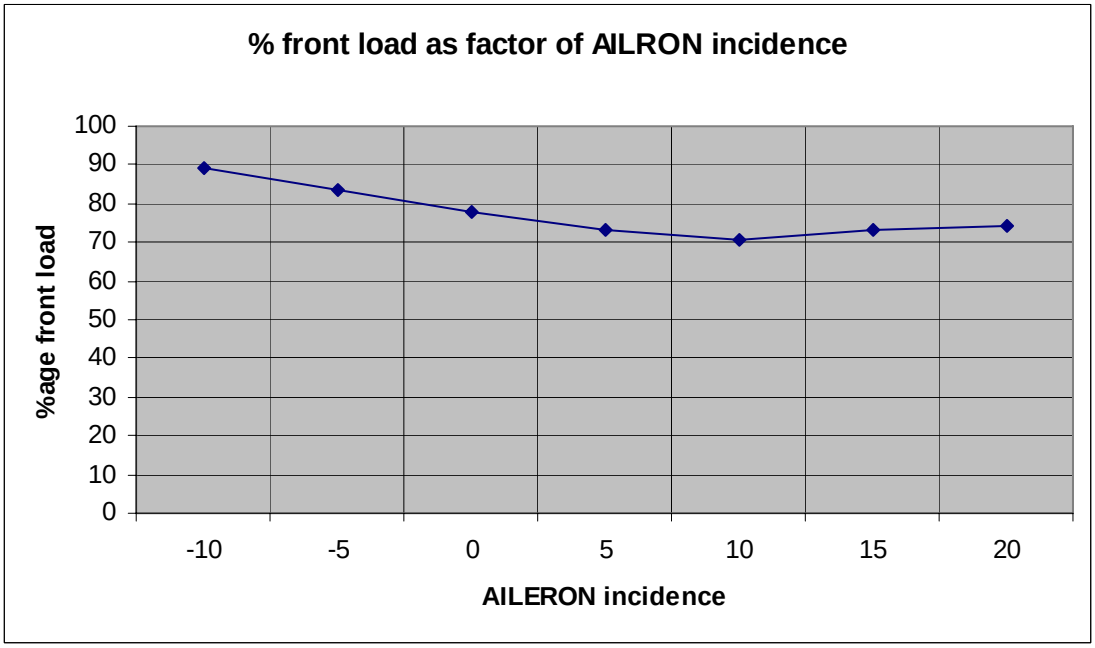
Fig. 16

Graph 17: Diagram of the influence of the rear wing on the SCX. It also shows the relative differences between the different positions of the rear wing.



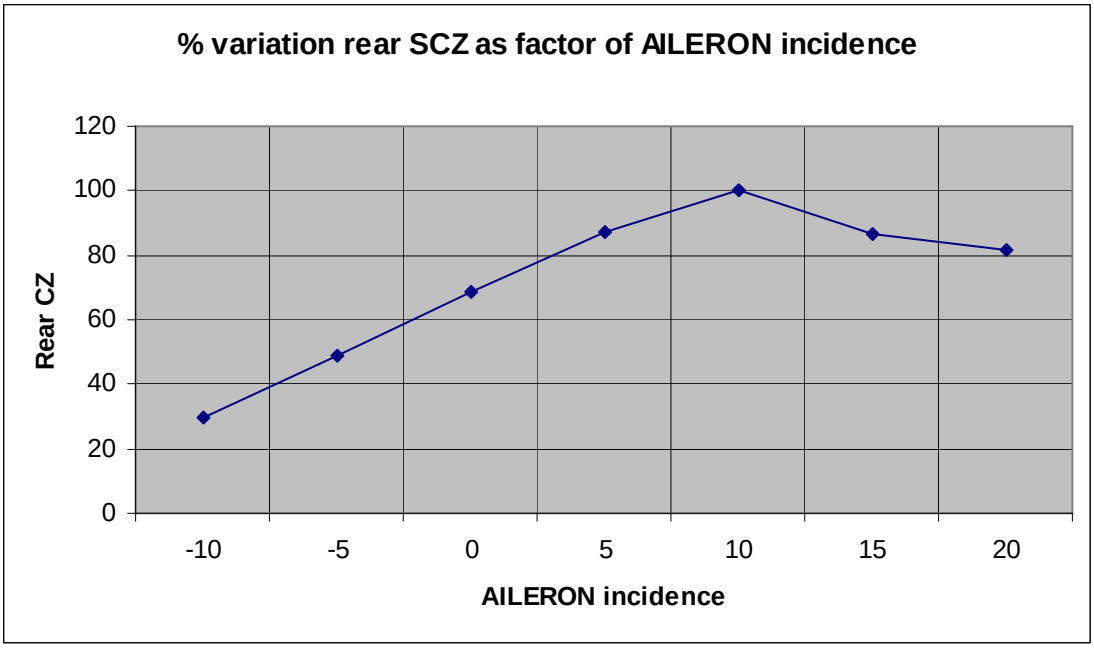
Graph 17

Graph 18: Aerodynamic load balance of the car as a function of the rear wing angle.



Graph 18

Graph 19: Percentage variation of the rear axle aerodynamic load as a function of the wing incidence.



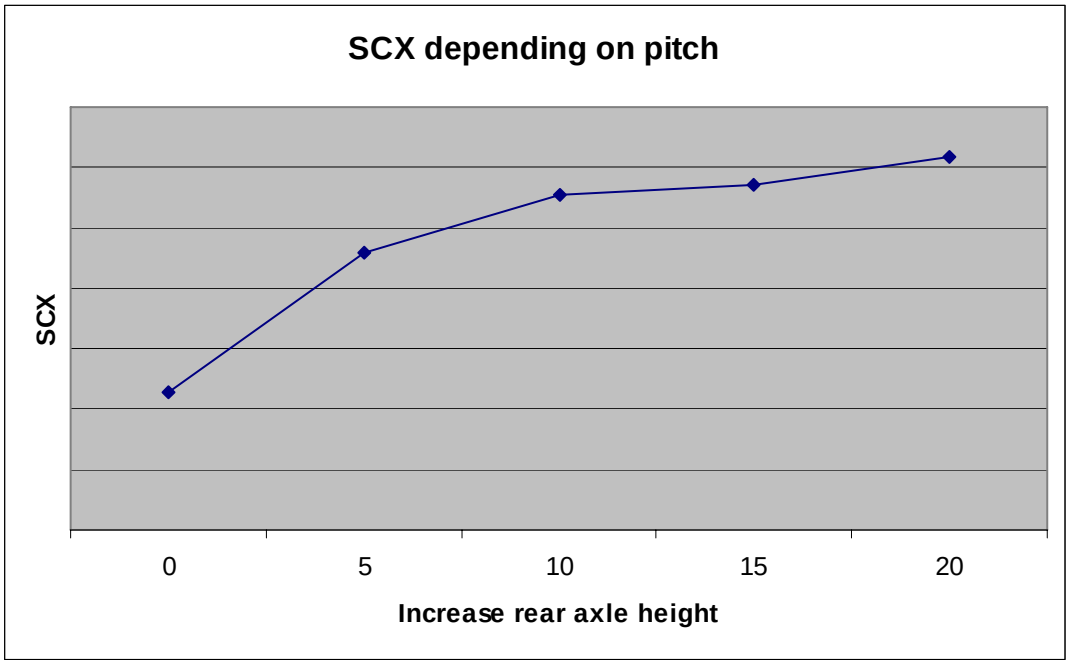
Graph 19

2.6.3 Pitch angle

The pitch angle of the car increases the aerodynamic load, especially on the front axle.

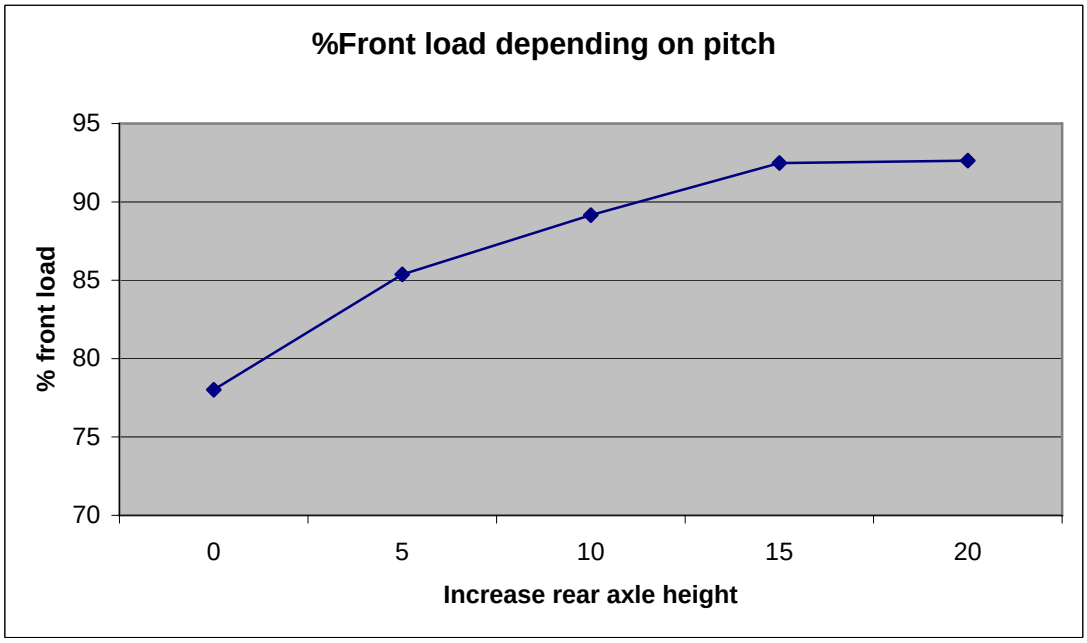
This angle is changed by increasing the height at the rear axle and keeping the front constant. The measurements are taken with an wing incidence of 0 degrees and always keeping the minimum height of 60 mm from the lowest point of the spoiler to the ground.

Graph 20: Diagram of the influence of the pitch of the car on the SCX. The relative differences between different pitch angles can be appreciated from this diagram.



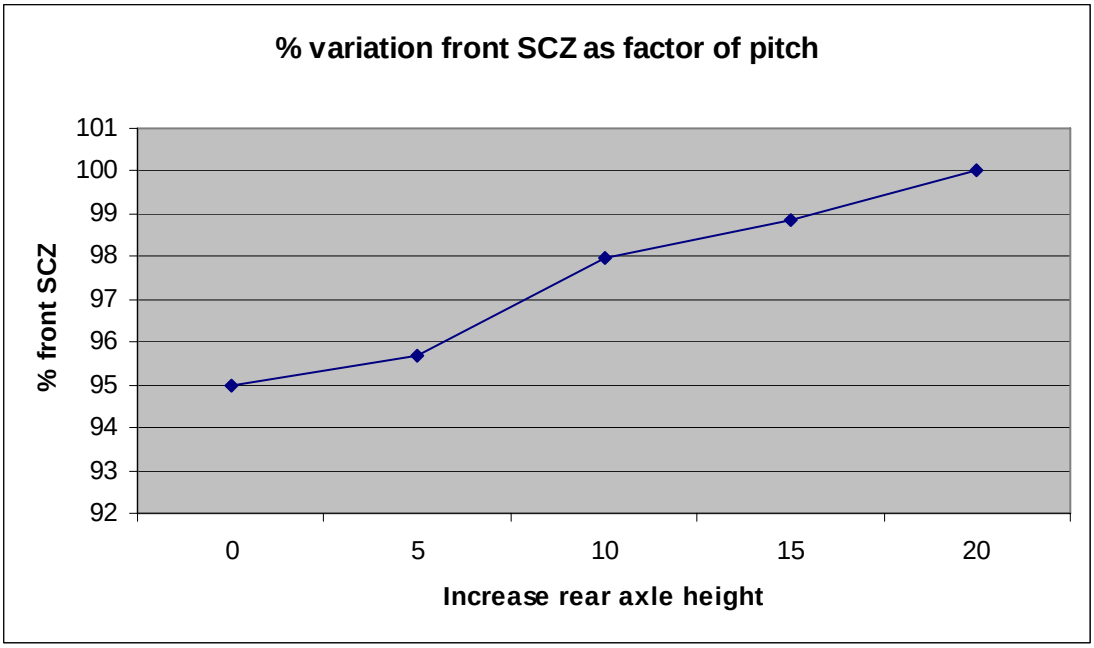
Graph 20

Graph 21: Aerodynamic load balance on the car as a function of pitch.



Graph 21

Graph 22: Percentage variation of the aerodynamic load on the rear axle as a function of pitch



Graph 22

3 MAINTENANCE AND SERVICE

3.1 Engine

The engine should follow the revision plan detailed in the point **3.1.1 Maintenance.** Engine services should be carried out at SEAT Sport, S.A.

The oil filter should be changed every time the engine oil is changed.

The oil level must be beetwen the dip stack marks.

The internal intercooler pipes must be cleaned periodicly.

The air filter is of the cotton wet type and should be checked and cleaned after each race using the normal products for this type of filter.

Audi/bosh spark plugs (reference _101905631B) should be used.

The recommended coolant is the green-coloured Repsol RP700F92 (-6ºC).

The engine should not be stopped by the main switch. First, turn off the ignition and then the main switch. To start up the engine, proceed in reverse order.

The oil level must be between the marks on the dipstick.

3.1.1 Fuel system

It is not recommendable to run with less than 5 litres, if not the fuel pumps can be damaged.

It's recommendable to change the flow fuel pump if in the data adquisition you can view the values under 2.4 bar on the fuel low channel. If the fuel pump is changed it's recommendable to substitute also the rubber joint.

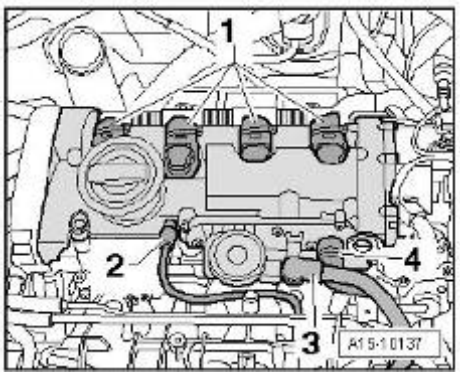
3.1.2 Turbo

It's very important to follow the maintenance plan detailed in the point **3.1.1 Maintenance.** In case that the turbo mileage recomended has been exceded or you apreciate a lack of power a turbo revision is recommended then of to control the system leakage.

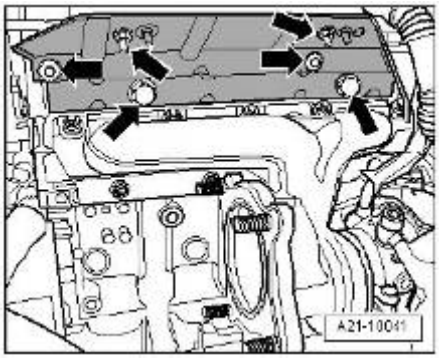
<u>Procedure at follow to change the Turbo</u>

1. Additional parts to disassemble to help at the turbo access.
   a. To empty the coolant water from the engine
   b. Pick up the air filter and pressure and vacum system pipes.

c. Disconnect and separate the coils wiring. →

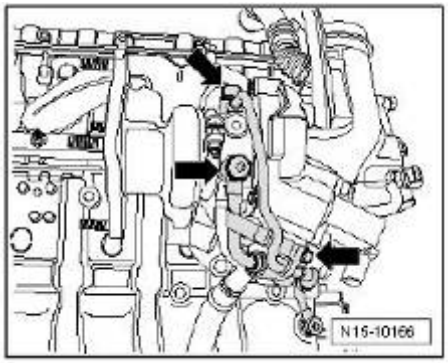


d. Take out the thermic protection.

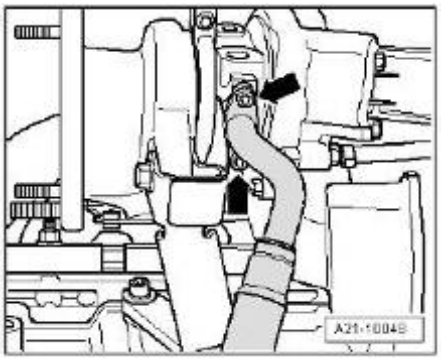


2. Unscrew the first exhaust tube. The new turbo is supplied with studs and nuts.

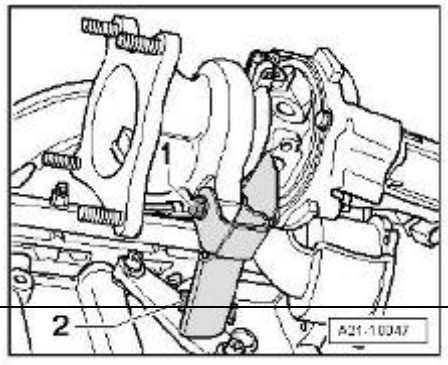
3. Disconnect the oil and coolant pipes, indicated in the drawing. - arrows-.



4. Disconnect the oil return pipe under the compressor.

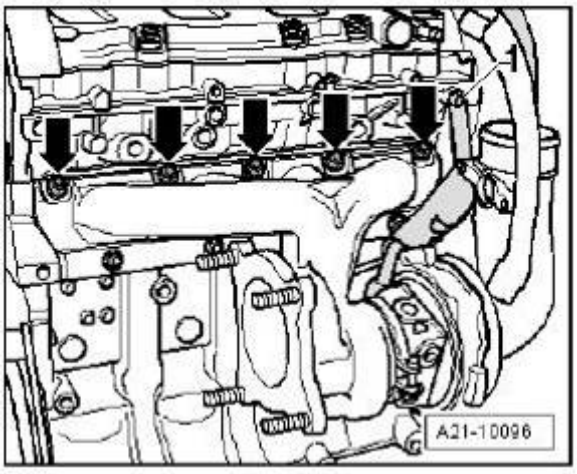


5. Disconnect the bolts 1- y 2- and take out the turbo compressor support.



4. Disassemble the exhaust manifold nuts – arrows-. ONLY THE UPPER ONES, like is shown in the next diagram. It's recommendable not take out the lower manifold support nuts.

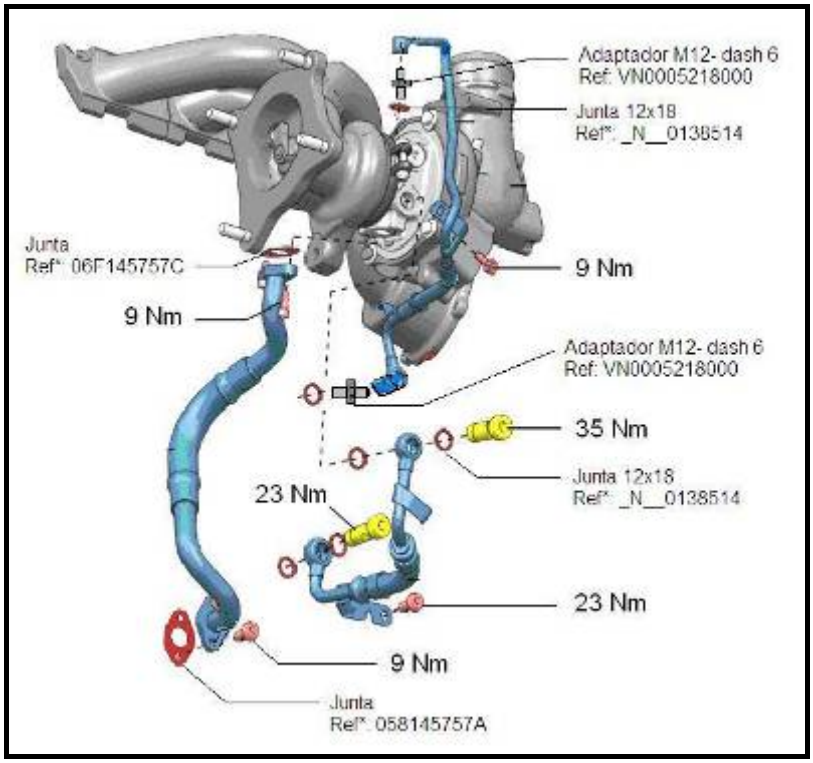
After these steps you can proceed to take the Turbo out from the car, from the left side.



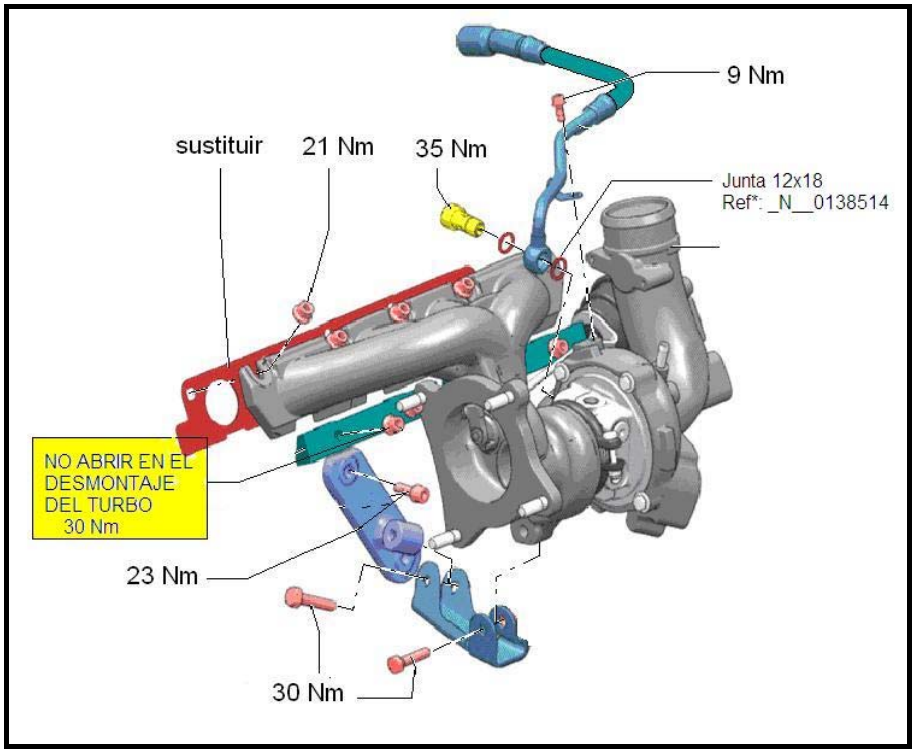
5. To Mount: Inverse the procedure taking into account the following points.

   a. Substitute every time the manifold joints and applay the indicated torque.
   b. Like a general norm, the nuts that are in contact with the exhaust manifold have to be humidity with antigrip hot grease.
   c. The joints leakproofness must to be in good conditions. Replace it if any doubt.
   d. Substitute the record adapter male-male M12-06D from the inlet turbo oil pipe to mount from the new turbo. Part VN0005218000 on the drawing 6 poitn 6.
   e. Fill the turbo compressor oil inlet with the engine oil. This procedure avoit that the turbo axle run with out oil in the firs moment.
   f. Clean all the pipes (inside and outside) before to assembled on the car.
   g. Mount the exhaust tube with out tensions.
   h. After mount all the pipes, filter,,,, etc, swich on the engine and check that is not leakage on the turbo area

6. **Torques.**



7. **Torques 2.**



3.2 **Gearbox**

Check and change the oil each season. The oil changes must be carried out at SEAT Sport S.A.

It is not necessary to change the gearbox oil if the car has the annual service. Should it need to be changed or after oil loss, it can be topped up. Proceed as follows:

1. Check the level: 1. Start the engine and wait for the cooling water to reach between 35 and 45 degrees. 2. Without stopping the engine, place a vessel beneath the oil change cap and remove the centre cap of the “double level cap” (Fig.18) below the gearbox. 3. At first, a negligible amount or the excess oil will come out. 4. Once the oil flow stops, a small quantity will come out at regular intervals of 30” come out liberated by the clutches. At that time the level cap can be refitted.

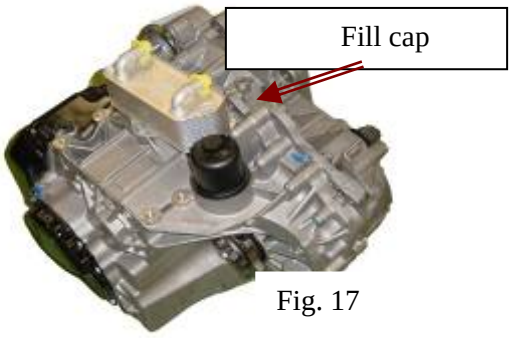


Fig. 17

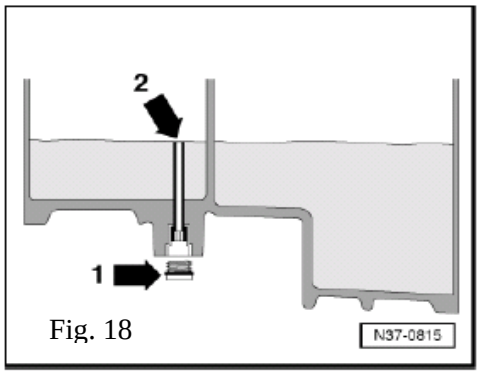
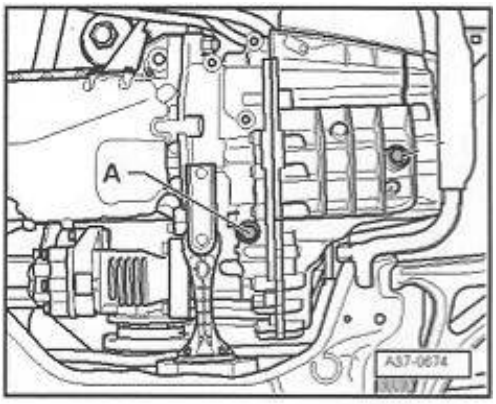


Fig. 18

2. Oil change: the total capacity is 7 l of VW DSG G052 182 oil. Change the oil as follows: 1. Engine off, remove two caps:



Overflow cap A (Fig. 19), the overflow cap 2 (Fig. 18) and the pinion box cap A (Fig. 19). 2. Replace the quantity removed with new oil (30 cl + if you have changed the filter) through the filler cap located on the top of the DSG SEAT Sport gearbox (Fig. 17). In this way it is not possible to remove the totally oil gearbox capcity, only 5.5 litter. It is recommendable to change the gearbox oil filter when you change the oil. 3. With the engine on and ticking over, press the brake pedal and move the gear stick through all the positions R-N-T-S-, holding it in each position for a minimum of 3 seconds.

3. Check the level as indicated in paragraph 1.

To replace the gearbox, remove the engine and the gearbox togheter in one piece and then disasemble the gearbox from the engine.

3.2.1 Mecatrónica.

Procedure to change the mecatronica:

- 1º: Prepare the necessary tools:
  - Torx tools
  - Big tray.
  - Medium screwdriver.
  - 3 litres of oil DSG
  -
- 2º: to have in account:
  - Clean the cover unions.
  - Before to open the gearbox cover look if the lip is in good conditions.
  - Put a drop of oil on the rubber joint before to mount.
  - The cover and mecatronica bolts must be assembled and disassembled in diagonal.
  - The torques supplied are valid for the bolts with out oil or grease.

- 3º: Procedure.
  - o Disconnect the battery and disassemble the start engine. Disconnect the main connector (20 pins). Take out the plastic engine air intake that is in front of the gearbox.
  - o Put the oil tray under the gearbox before to open the cover.
  - o Disassemble the mecatronica cover 1 (diagram 1M), and press to open it.

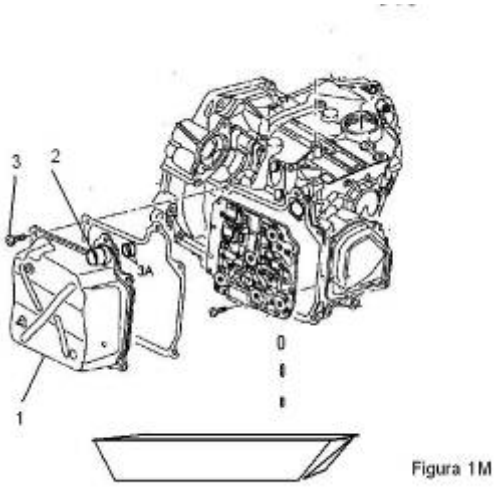
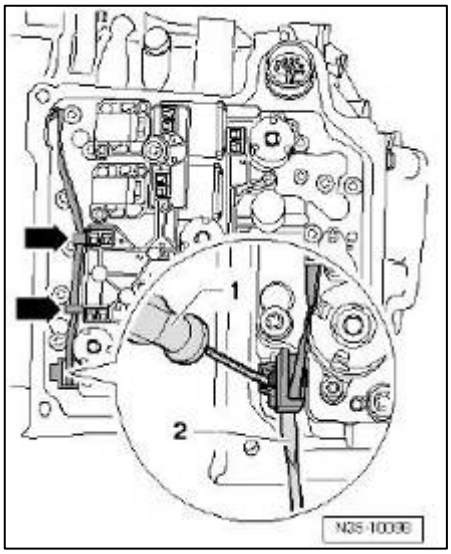
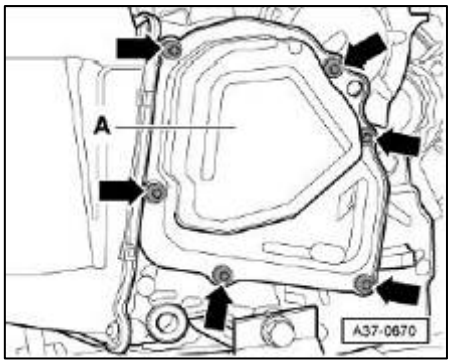


Figura 1M

  - o Disassemble the lateral cover from the oil pump –A- to guide the mecatronica arm.
  - o Disconnect the transmisor –G182- and –G509- using a screwdriver carefully.

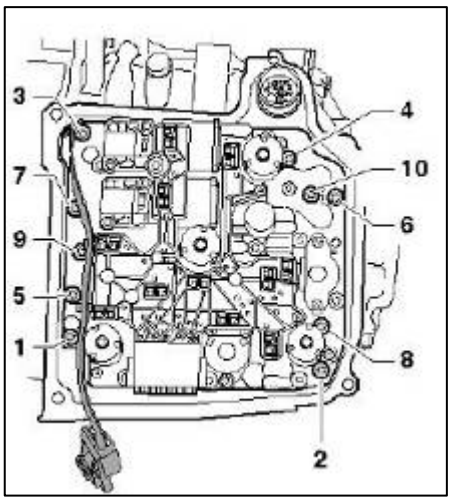


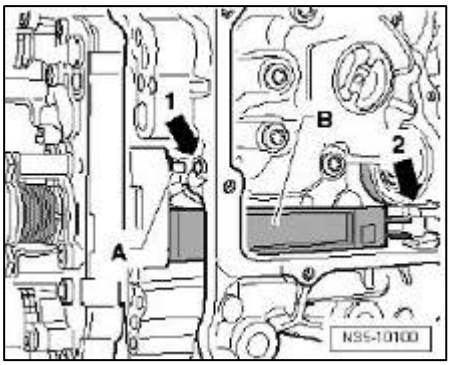


  - o 2. Take out the wiring trought the –G182-/-G509-

  - o Disassemble the mecatronica bolts following the order shown on this diagram -1 … to.. 10.

  - o Take out carefully the Mecatronica unit, until the sensors arm is out complete.





- Tilt the mecatronica under gearbox, taking in account don't catch the mecatronica from its arm.

- 3º: <u>Mount procedure.</u>

Invert the process taking in account the following indications:

- No damage the mecatronica arm when assembling in the gearbox.
- Don't crush the wiring from the connector –A- when you assemble the mecatronica. Mount and screwing the mecatronica bolts at the sequence indicated and at 13 Nm torque.
- Mount the mecatronica cover screwing and its bolts in diagonal at 16 Nm.
- Assemble the lateral cover screwing the bolts in diagonal and at 8 Nm.
- Measure the quantity of oil removed and replace it with the same quantity.

3.3 **Suspension**

All the suspension ball joints should be checked after every race.

Wheel studs are mounted on the hub at 150 Nm and with Loctite 270, penetrating the rear area to fix them to the hub and prevent them from coming loose. The threads should be in perfect condition and bolts with worn threads should not be used.

3.3.1 Front suspension

The front upright is made in aluminium. Therefore, repair is not possible, meaning that, in case of any crack, fissure or deformation, it must be replaced by a new one.

To separate the shock absorber from the hoses, insert a 6 mm Allen key in the hose slot and turn it 45º to free the interference between both parts, don't do it with any thiker tool due to breaking risk.

The wheel bearing and hub are the same part. It is screwed to the hose at the tightening torque indicated in section 4.7.

To tighten the drive shaft, there is a support spacer between the shaft screw and the hub. It should be replaced after it has been tightened 4 times.

The front anti-roll bar is mounted with a polyamide bushing that should be lubricated with PTFE containing grease.

In the top mount of the shock absorber, PTFE-containing lubricant must be applied to the polyamide washer that serves as a bearing between the limit stop of the spring and the inner bushing of the ball joint.

3.3.2 Rear suspension

The rear anti-roll bar is assembled with a polyamide bushing that must be lubricated with PTFE-containing grease.

3.3.3 Shock absorbers

The shock absorbers should be serviced regularly, especially if you think performance has been lost. Only SEAT Sport is authorised for this service.

3.4 **Steering**

The recommended power steering liquid is VW G.002.000. The necessary quantity for filling the circuit is approximately 1.1 l.

The small steering connecting rods are marked with the letter R and L. The one marked R should be fitted on the left side and the one marked L should be fitted on the right side in driving position.

At any how an over revving has occurred, it's advisable to change the power steering pump.

3.5 **Brakes**

The brake liquid recommended for the car is specific for racing brakes and is resistant to high temperatures. Approximately 1.5 litres are needed to fill the entire circuit. A racing liquid should always be used.

The scru of the brake balance regulator should be mounted with a 2 mm play on each side of the pedal in order to ensure the correct operation of the system, avoiding the locking of the bolt.

The disc and pad working life depends on driving style. They should be changed when they are worn or they produce vibration.

3.5.1 Running in the pads

To run in the brake pads correctly, proceed as follows.

a) Drive for two laps carrying out short braking, keeping the disk temperature constant.

b) Drive for one lap without braking to let the disks cool down.

c) Drive for two laps normally, having in mind that, on the first laps, full braking power will not be available.

d) Stop in the pits and leave the system to cool down.

3.6 Body shell

3.6.1 Rebuilding

The only possible reparations are those from to repair an accident. Those works must be done by realignment or substitution the damaged parts.

The repairs from the roll bar only can be done for the manufacturer like is indicated at the annex J rules FIA.

WELDING ON THE BODY SHELL:

IMPORTANT: To do any weld on the body shell Para efectuar cualquier soldadura deben desconectarse todos los elementos electrónicos del coche, ya que pueden verse afectados, (centralita motor, gate way, inmovilizador, ABS-CAN, cambio DSG, modulo de volante, caudalímetro), y las diferentes piezas que crea oportunas, (deposito de combustible, baket,,,) con el fin de evitar cualquier incendio, recomendando tener siempre un extintor a mano.

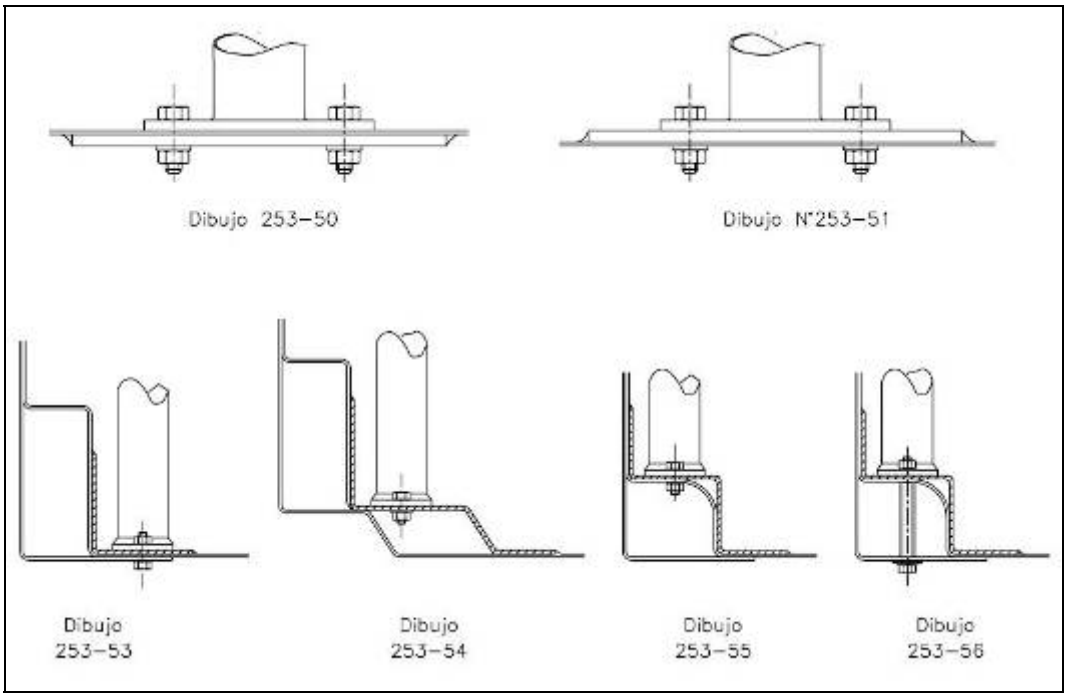
3.6.2 Codriver baquet fixation

If for any reason a second seat needs to be installed in the passenger side place, and this car participates in the Supercopa SEAT Leon championship, must fulfil the following requirements.

In order not to reinforce or modify the vehicle structure, the passenger's seat support must be removable, and it must be dismounted when participating in the Supercopa events. The supports fixation must fulfil the following rule:

- Fixation: The fixation must fulfil the *"Annexed "J" Art. 253 - 16. _"Seats attachments and supports"*. In that sense, during the Supercopa SEAT Leon events are only permitted the "fixation reinforcements" *(3mm thickness and 120 cm^2)* where the guides of baquet support bars are fixed as shown in the "Annexed "J" drawings 253-50 to the 253-56".

- Scrutieneering: The technical Marshal will verify the works have been made correctly also valuing neatness and presentation



3.7 Composites

The flat bottom and lateral wings are made of Twintex,
Next is shown the different procedures to follow in case of damage.

3.7.1 Case 1: Little repaires (non structural).

Fig. 1. Some abrasion.

Materials:

- Acetone.
- Poliéster putty 599.
- Handpaper 120.
- Black-mate paint.

Procedure:

1. Cleaning properly the surface and repair it with Acetona
2. The product proportion must be 1 to 3 %. Too much one of the two products could harden the mix before applying it. The opposite could take too much time (It is soft and it can't be touched nor be painted)
3. Expand the polyesther putty over the surface, taking care of covering all the surface but being aware not to go over the contour (normal procedure of paint and plate)
4. Depending on the air temperature and the humidity , this process can last from 10 to 25 minutes.
5. Once it is dry, polish with the sandpaper 120.
6. Clean with acetone to paint with the black-mate paint

Fig. 2. Be carefull with the masilla. It must be well extended and only in the area to be repaired.

3.7.2 Case 2: Repairs with minumum structural damage.

Minimum structural damages. See Fig.3.

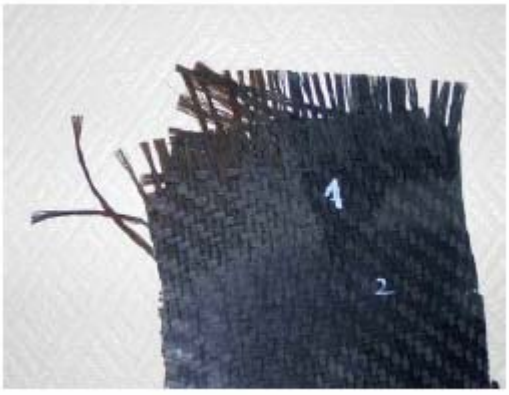


Fig. 3ª. Twintex delamination.

The glass fiber is exposed ...It can occur at high temperatures (200ºC or more), and also in some friction cases.

Materials:

- Acetone.
- Sandpaper grade 60.
- Propylene plates (0,35 – 0,50 mm width , see fig. 3b).
- Heat gun.

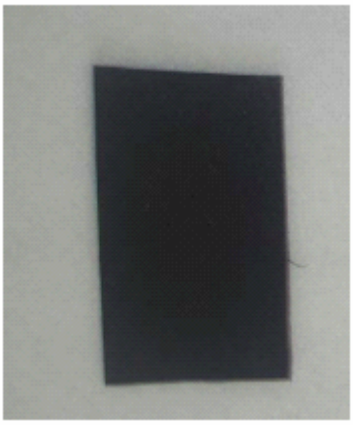


Fig. 3b. Propylene sheet

Procedure:

1. Clean with acetone.
2. To sand (grade 60) the zone with the damage plus 5 extra cm each side. Eliminate the remainders.
3. Cut a propylene plate. The size must be the affected zone plus the 5 extra cm each side
4. Heat the area to be repaired till softens. The heat gun must be handled carefully and with little fire because the propylene cold be burned.
5. Put the plate and heat it in similar way to the previous step
6. Press the area to be compacted. It must be done with the plane part of the tool, during at least 1 minute. It is important to do the same pressure in all the area. If don't there big pores will appear.

3.7.3 Case 3: Medium structural damages.

For medium structural damages (little fractures and cracks till 5 to 6 cm maximum), the previous process could be followed. But it is also necessary to insert a Twintex plate (apart from the propylene plate)

Materials:

- Acetone.
- Sandpaper grade 60.
- Propylene plate (0,35 – 0,50 mm width).
- Twintex plates
- Heat gun.

Procedure:

Same that previous step. The Twintex plates usually takes more time to be heated. It is very important to press all the area till it gets cold. If don't, the Twintex can lose the propylene and be very weak. The Teflon avoid the propylene to get stack into the palette.

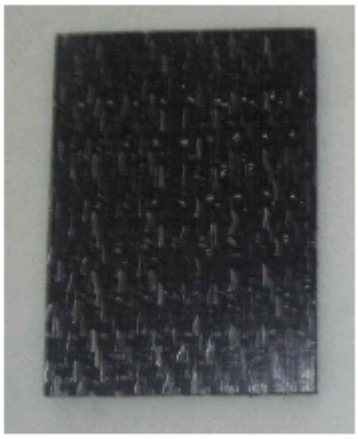


Fig. 4. Placa de Twintex.

3.7.4 Case 4: Structural repairs.

In case of grave damage, substitute the piece.

Recommend:

- Any case, don't do it in ventilated places. There is some risk of heat crash (cracks because high temperature differences)
- If the piece is very dirty (mud etc..), clean it properly with water and soap. Once it is dry follows the procedure with the acetone.

3.8 **Electrical**

3.8.1 Recommendations

- The León Supercopa MK2 2008 has system to transmit the car data between the different electronic modules through a community line. This line has the name "CAN Line". From this system data overload is not supported, for this reason is advisable not connect any electric device using the fuses or the wiring loom that the car have. If you want to install a electronic device you must connect directly at the battery.
- It's recommendable to clean the connectors if had been disconnected. The voltages employed are lower and any dirty can cause a bad connection.
- When disconnect the connector don't pull through the wiring loom. Push a little bit into the connector, lift the block pat and now pull off the connector.
- Don't fix the wiring loom with the clamps too tight.
- Flow meter must be mounting at 45º respect at the vertical.
- It's advisable to check the fuses console periodically. Check the fuses connection (that there is no oxide) and the cable rigidity and connections.

3.8.2 Diagnosis.

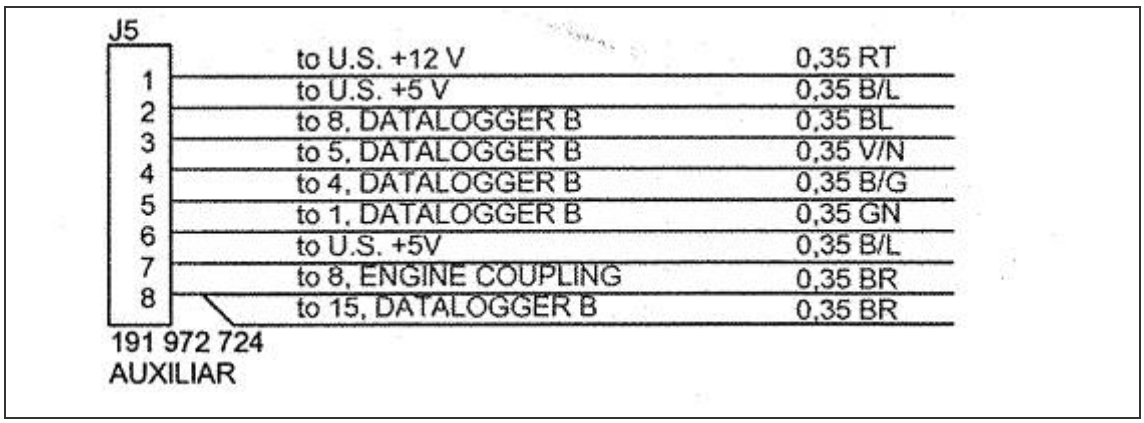
The Leon Supercopa MK2 is equipped with two systems for diagnosis of failures.

- Logger Motrosport
- VAS / VAG

3.8.3 Logger:

It is possible to detect problems by analysing the data recorded in the logger. It is also possible to check the available channels in real time (point 1.3.2 of this manual). With the car it's supplied a AIM data recorder user manual.

Inside the cockpit there is available a auxiliary connector to connect 4 extra sensors. The connector scheme is the following.



3.8.4 VAS:

There is a connector In the Leon Supercopa Mk2 (right door) for the Diagnosis for series vehicles "VAS" at the VW Group dealers. This system is used in the series vehicles. You can use this system through the liaison net of VW Group for the control, analysis and erasure of possible failures using the factory manuals.

Following are showed the interesting data of the 2 control León Supercopa groups that you can see thru the VAS VW Group diagnosis system.

ENGINE GROUP O1:

Following the 4 available subgroups from the León Supercopa Mk2 engine group:

02 Failure memory: Here you find the permanent and sporadic failures that has occurred since the ignition has been switched on. It's advisable to delete the sporadic failures marked "ESP", and to check if they are showing once again after a new run.

05 Failure memory deleting: Here you clean all the messages from the failure memory. If any of them keep showing after applying this action, have a look to the Failure Table.

06 Exit: Here you can go back to the last page visited.

08 Measuring block: Following are showed the more usual available block:

- Block 11 (temperatures)
  1) Rpm
  2) Engine water temperature
  3) Inlet air temperature

- Block 53 (Battery charge)
  1) Rpm
  2) Teoric rpm
  3) Battery voltage
  4) Generator charge

- Block 62 (foot throttle throttle)
  1) Throttle angel potentiometer 1
  2) Throttle angle potentiometer 2
  3) Transmitter throttle angle potentiometer 1
  4) Transmitter throttle angle potentiometer 2

TRANSMISION GROUP 02:

In that group there are 2 undeletable failures due to software characteristics: 18255 and 18270, neither of them doesn't have any effect on the DSG functions.

02 Failure memory: Here you find the permanent and sporadic failures that has occurred since the ignition has been switched on. It's advisable to delete the sporadic failures marked "ESP", and to check if they are showing once again after a new run.

05 Failure memory deleting: Here you clean all the messages from the failure memory. If any of them keep showing after applying this action, have a look to the Failure Table.

06 Exit: Here you can go back to the last page visited.

04 Basic adjusment: Here you match the electronic and mechanical parameters between them.

Must do it in the following cases:

- If the mechatronic has been changed.
- Because the VAS program shows " basic adjusment not done"
- Any time you assemble a new Gear Box
- By SEAT Sport indications.

How to do a "basic Adjustment"

IN THE CAR

a) Start the engine, look and "Erase" if there is any failure showed in 02 Failures.
b) The gear box oil temperature must be higher than 35°C. (visible at the measures block 08 - block 19).
c) Push the brake pedal (recommended minimum pressure 10 bar), press both gear box module button, and don't release until "P" is displayed in that module.

ON VAS / PC

d) With engine running, enter in the 04 "Basic Adjustment" subgroup keeping the brake pedal pushed down continue as follows:
   i. Enter value group 65. The showed values must be 0 bar.

ii. Enter value group 61. When the bottom screen will show it's four values in a stable manner, you can go to the next step.

iii. Enter value group 60. When the bottom screen will show it's four values in a stable manner, then press go back 06, to exit from the Basic adjustment function.

e) Push both gear box module button until the "N" it's showed in it. Depress the brake pedal, stop the engine and disconnect the main switch during 3" to aloud the system to accomplish the whole process.

NOTE: Noises and movements are produced by the gear box during the whole process, that's normal.

3.8.4.1 *Failure codes table:*

Following are showed the more usual failure codes that shows the failure VAS system.

Descripción VAS & Problema	Posible causas	Acción y comprobación
VAS 12555. Low fuel press regulation. Intermitent	o Low pressure petrol pump damaged. o Ignition has been switched on when the low pressure petrol pump was disconnected. o To low petrol level running.	o Change the low pressure petrol pump, and delete the failure. o Delete the failure. o Refuel for proper petrol level and delete the failure.
VAS-00568. Boost pressure sensor signal to high.	o Boost pressure sensor disconnected or broken. o Pressure leakage. o Broken turbo	o Check connection or change boost sensor and delete failure. o Check boost pressure at data AIM adquisition,. o Put a new one.
VAS-28775. Gear lever with out comunication.	o Ignition switch on with unplugged steering wheel connector. o Broken wire in the steering wheel spiral cable.	o Delete failure. o Check for cable continuity.
VAS-17106. Gear box	o Internal gear box sensor	o Delete failure, if it

final drive sensor G195 Intermitent VAS-17106. Gear box final drive sensor G196 Intermitent	misreading.	shows back contact with SEAT Sport.
Engine idling only for one second.	o No petrol. o No fuel pressure. o Damaged flow meter.	o Check in AIM data. o Check:
	o	o

Any doubt on the system contact with the technical personnel of Sport SEAT.

3.8.5 Battery

The battery is an SBS 30 dry battery.

Charging the battery

- The battery has no memory effect let not to be fully discharged before charging it.
- The charging voltage should be constant, between 14.1 and 14.7 V at 25ºC.
- The charger should be able to produce the current required for 10 A. If lower intensity is used, the charging time will be longer.
- The battery should not be fully discharged, since, in this case, it is difficult to then fully recharge it.

Safety regulations

- The battery should not be charged when hot.
- It should be stored at temperatures between –65ºC and +60ºC, although it is better kept at a constant temperature of 25ºC.
- The bolts of the terminals should be tightened to a maximum of 4 Nm.

3.8.6 Circuit-breaker/contact

The Leon Super Cup Mk2 is fitted with a contact-type circuit-breaker (main switch). This type of circuit-breaker has a low consumption but enough to drain the battery if connected for a long period with the engine not running (24 hours), which means it should be disconnected 20 minutes after stopping the car.

3.8.7 Fuel

The pressure of the low-pressure pumps, which can be checked through the data acquisition, must be kept between 3 and 7 bar, depending on the engine requirements. In case to detect ((througt the AIM Adquisition - Chanel low fuel press) some values more down than 3bar, the change of the low fuel pump is recommended.

You can remove petrol from the tank to carry out practice laps with the minimum weight. SSp has fitted an homologated quick-connection valve so that petrol may be removed without needing to disconnect any pipes. In its spare parts catalogue, SEAT Sport has included a tool that allows you to activate the fuel pump from outside the car for maximum safety.

Procedure to remove the fuel:

- Disconnect the battery through the main switch.
- Unplugged the electrical connector on the top of the fuel tank pump and plugged the electrical connector tool U4PL9711001.
- Plugged the FIA fuel connector placed in the engine room (right side).
- Switch on the main switch placed on the pilot console. The system is ready to be used when the tool switch will be on.
- For utilise this system you doesn't switch on the contact switch.

Note: If any person switch on the contact switch when the chassis loom pump connector is unplugged one fault will appear in the VAS system "Nº 12555".

IMPORTANT:

Take attention when the Remove fuel System is working. Never the fuel pump must works whit out fuel. If this is success, the fuel pump can lose performance.

Never less the system working with a person near controlling the system.

When the fuel remove is finished, take attention to plugged the electric connector correctly, (earth the clic)

Periodical cleaning of the pre-filter of the fuel pump located inside the petrol tank is recommended as well as changing the filter in the fuel line to the engine.

3.8.8 Turbo water re-circulation pump

When the engine is stopped, don't switched off the main switch inmediately, as an electric water pump continues to cool down the turbo. It remains working until it is stopped by the engine management centre. This occurs during 15 minutes after the hot engine has been switched off.

If the engine cooling circuit does not have water, do not activate the main switch or disconnect the electrical pump of the system.

3.8.9 Extinguisher

The León Super Cup Mk2 is fitted with an electrical extinguishing system connected to the electronic battery-disconnection system. If the extinguishing system needs to be activated, the battery will be deactivated at the same time.

Specifications

Don't forget before to go inside the track to check the system in on.

System	
Cylinder pressure	14 bar
Supply	1 9 V alkaline battery
Electrical valve ignition	9V without polarity

Extinguishing liquid	
Type	-20ºC / +60ºC
Colour	Light red
Density	1.10±0.03 kg/dm^3
pH	7±1
Sublimation temperature	>100ºC
Boiling point	100ºC

Operation check

The control units are equipped with a red button for activating the system and for the test with a switch and its corresponding green light.

- Switch in **off** position, press the button, the green LED should come on.
- Switch in **on** position, press one of the red activation buttons (interior or exterior), the liquid comes out and cannot be stopped.

Maintenance

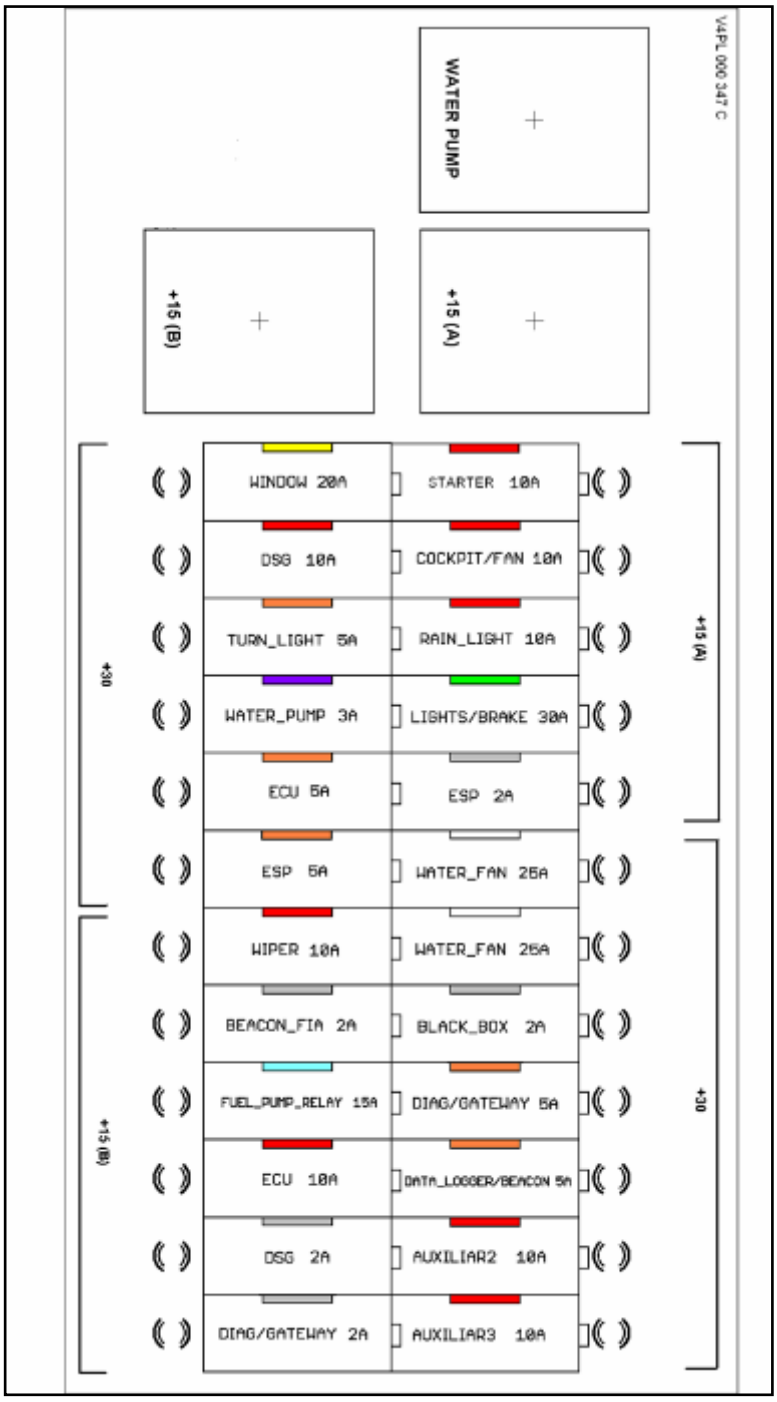
The maintenance operations are the following:

- Check the bottle pressure gauge needle.
- Clean the system regularly. To do this, the pipe connections should be disconnected and air should be blown into the pipes, the connectors and the valves.
- Check the pipes for deformities and leaks.

- Do not leave the control box in the vehicle for long periods of time
- The system should be checked every 2 years by OMP or any other company authorized by OMP, using the reference date indicated on the bottle.
- In case of accident without fire or activation of the system, perform the above tests.
- In case of activation with fire, have OMP or any company authorized by OMP refill the bottle and replace the pipes, connectors and valves.

3.8.10 Fuses and relays

Diagram of the position of the 2008 cars fuses box.



The 2008 fuses box is different from the 2007 one. 2008 one is more robust and it have led indicator for each fuse. The procedure to check the fuses the is: switch on the main switch to check the “30” fuses and then switch on the contact to check the “15” ones.

IMPORTANT: To check the “30” fuses ever is necessary to do it only by the main switch on, and with the contact switch off.

3.9 Tightening Torques

The following table shows the standard tightening torque values. These are the maximum values at which a bolt of this type should be tightened. These tightening torques are for steel on steel. On aluminium or on helicoil, the torque level should be lower.

The table gives the dry and greased tightening torques. Common, medium-viscosity grease has been used as a reference. If a very different grease is used, the values should be different.

Standard tightening torque values:

ISO PROFILES		Dry			Grease		
Metric		**8.8**	**10.9**	**12.9**	**8.8**	**10.9**	**12.9**
Quality	**Thread**	**Torque**			**Torque**		
4	**0.70**	3.1	4.3	5.2	2.1	2.9	3.5
5	**0.80**	6.2	8.8	10.5	4.1	5.8	7.0
6	**1.00**	10.6	14.9	17.9	7.1	9.9	11.9
8	**1.25**	25.8	36.2	43.5	17.1	24.0	28.8
9	**1.25**	38.1	53.5	64.2	25.0	35.1	42.2
10	**1.00**	56.5	79.4	95.3	36.3	51.0	61.3
10	**1.25**	53.7	75.6	90.7	35.0	49.2	59.1
10	**1.50**	51.0	71.7	86.1	33.7	47.4	56.8
12	**1.50**	92.9	130.6	156.7	60.5	85.1	102.1
12	**1.75**	88.9	125.1	150.1	58.6	82.4	98.9
14	**2.00**	142.1	199.8	239.8	93.5	131.4	157.7
16	**2.00**	220.1	309.6	371.5	143.4	201.7	242.0
18	**2.00**	322.3	453.2	543.8	208.4	293.1	351.7
20	**2.50**	429.9	604.6	725.5	280.1	393.9	472.7
22	**2.50**	585.5	823.3	988.0	379.1	533.2	639.8

- All the bolts and studs should be mounted under appropriate conditions.
- All the bolts screwed on helicoil cannot use Loctite; only anti-grip grease can be used.
- When anti-grip grease is used, copper grease or SEAT G052 112 MK grease it's recomended

For bolts that have not been specifically indicated in this manual, the values in the standard tightening torque table should be applyed.

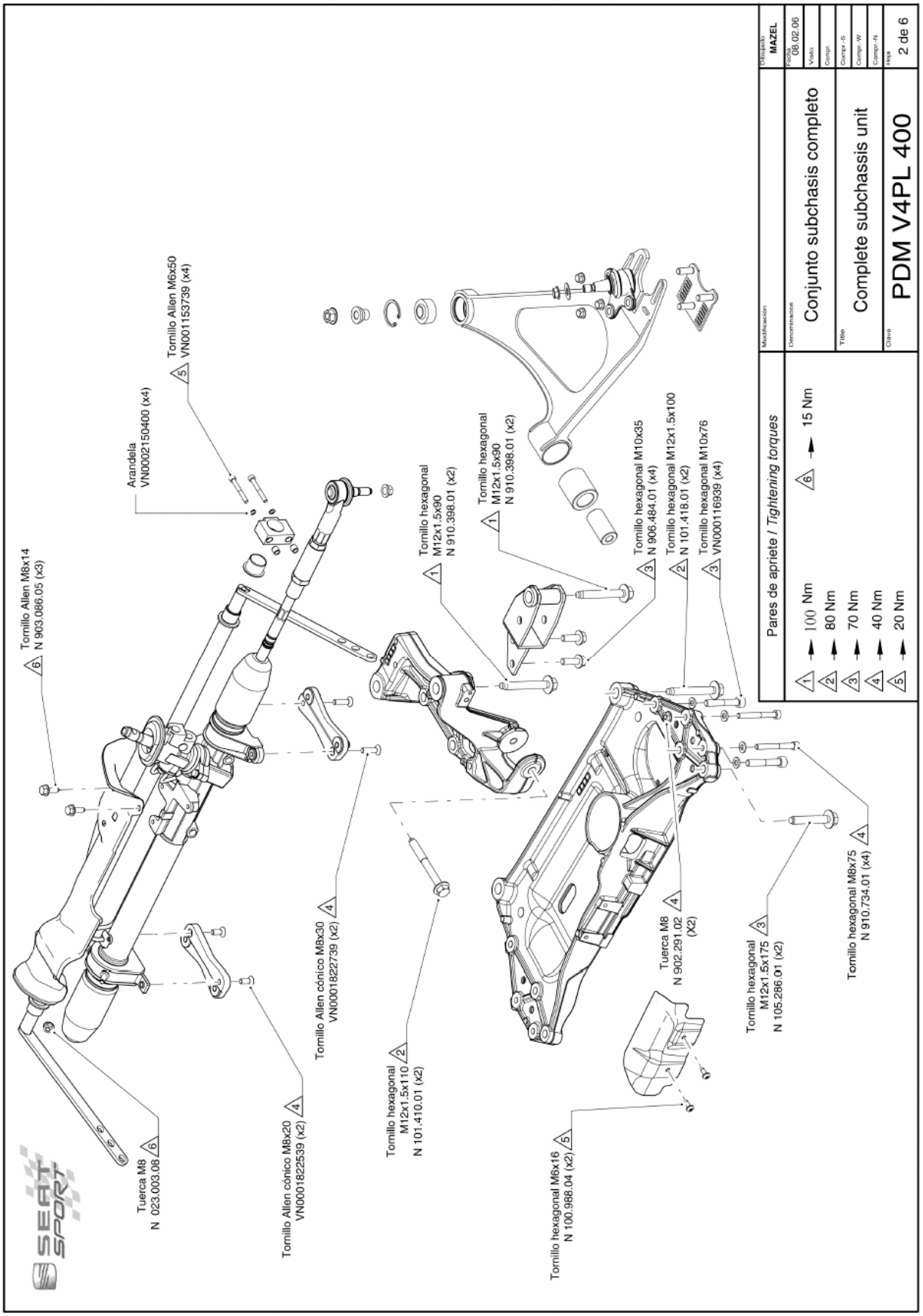
3.10 Specific Torques

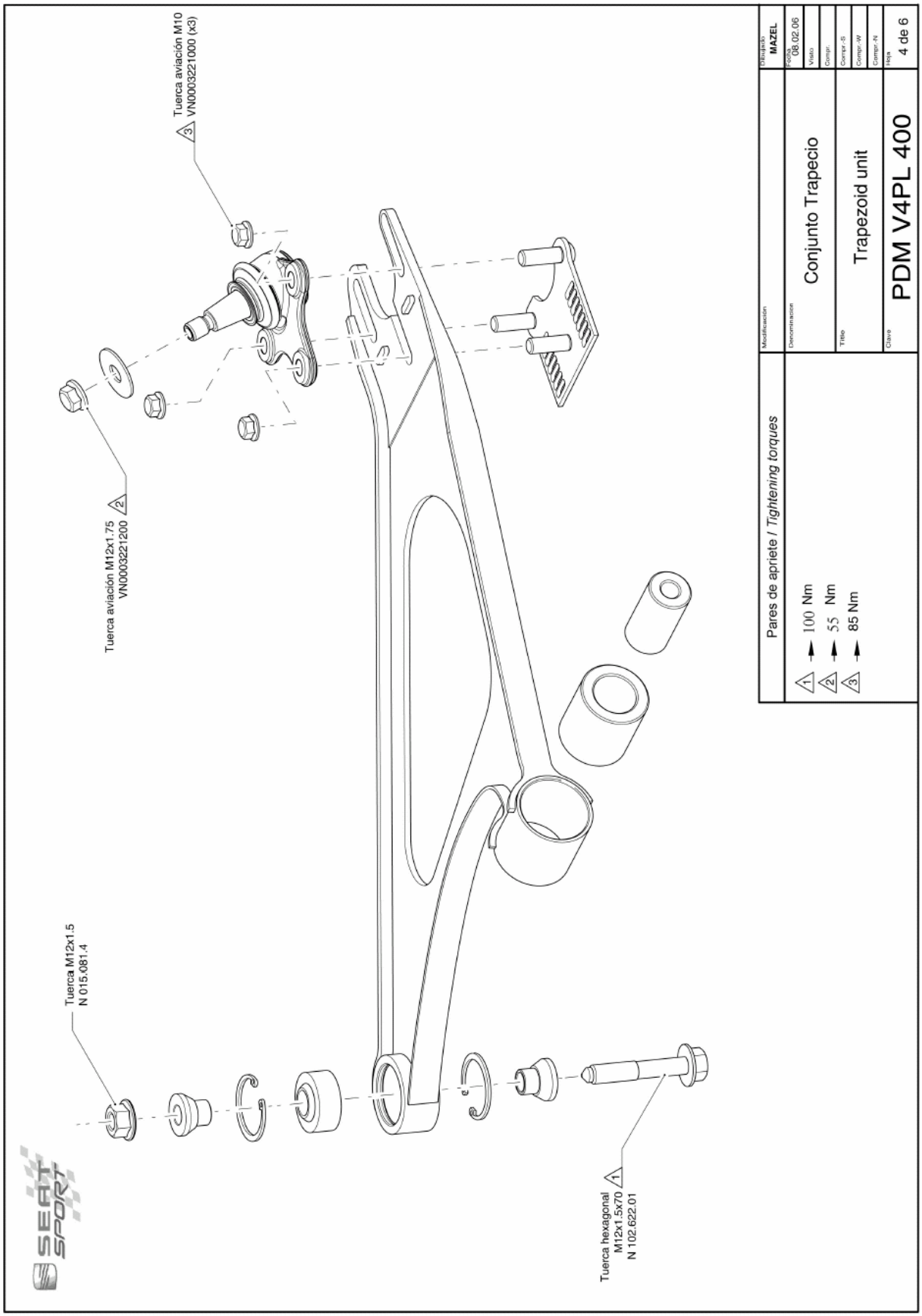
Following is shown a table from the torques more usual. From the turbo and mecatronica you can look on the Maintenace charpter.

Description	Torque	Note
ENGINE AND GEARBOX		
Fly wheel	90 Nm	New
Turbo		See 3.1.1 turbo
Knock sensor 1 and 2	20 Nm	
Exhaus manifold	21 Nm	
Air filter	20 Nm	
Semi axle support	60 Nm	Intermediate right support
GEAR BOX		
Mecatrónica	13 Nm	Screw in diagonal, see 3.2.1
Mecatronica cover	16 Nm	Screw in diagonal, see 3.2.1
Lateral cover	8 Nm	Screw in diagonal, see 3.2.1
M12 gearbox to engine bolts	80 Nm	
M10 gearbox to engine bolt	60 Nm	
SUSPENSION		
Wheel nut	90 Nm	Plus temperature grease
External drive shaft	240 Nm unscrew and screw at 240 Nm + 90º	Substitute the bolt each time
Internal drive shaft	70 Nm	
Front shock absorber to upright	60 Nm	
Front shock higher nut	By hand	Unscrew with the impact tool
Rear shoct to uprigth	35 Nm	Ever with dinamometric tool
Rear shock to the uoright	50 Nm	
Rear bearing	240 Nm	Substitute the bolt each time
BRAKE		
Front calliper	90 Nm	
Rear support calliper to the upright	80 Nm	torx tool 12 singins Ø 14

In the next PDM there are the most used torques:

Front axel


Tornillo Allen M6x50
VN0001153739 (x4)
Arandela
VN0002150400 (x4)
Tornillo Allen M8x14
N 903.086.05 (x3)
Tornillo hexagonal
M12x1.5x90
N 910.398.01 (x2)
Tornillo hexagonal
M12x1.5x90
N 910.398.01 (x2)
Tornillo hexagonal M10x35
N 906.484.01 (x4)
Tornillo hexagonal M12x1.5x100
N 101.418.01 (x2)
Tornillo hexagonal M10x76
VN0001116939 (x4)
Tornillo Allen cónico M8x30
VN0001822739 (x2)
Tornillo hexagonal
M12x1.5x110
N 101.410.01 (x2)
Tuerca M8
N 902.291.02
(X2)
Tornillo hexagonal
M12x1.5x175
N 105.286.01 (x2)
Tornillo hexagonal M8x75
N 910.734.01 (x4)
Tuerca M8
N 023.003.08
Tornillo Allen cónico M8x20
VN0001822539 (x2)
Tornillo hexagonal M6x16
N 100.988.04 (x2)
Pares de apriete / Tightening torques
100 Nm
80 Nm
70 Nm
40 Nm
20 Nm
15 Nm
Modificación
Denominación
Conjunto subchasis completo
Título
Complete subchassis unit
Clave
PDM V4PL 400
Dibujado
MAZEL
Fecha
08.02.06
Visto
Compr.
Compr.-S
Compr.-W
Compr.-N
Hoja
2 de 6
SEAT SPORT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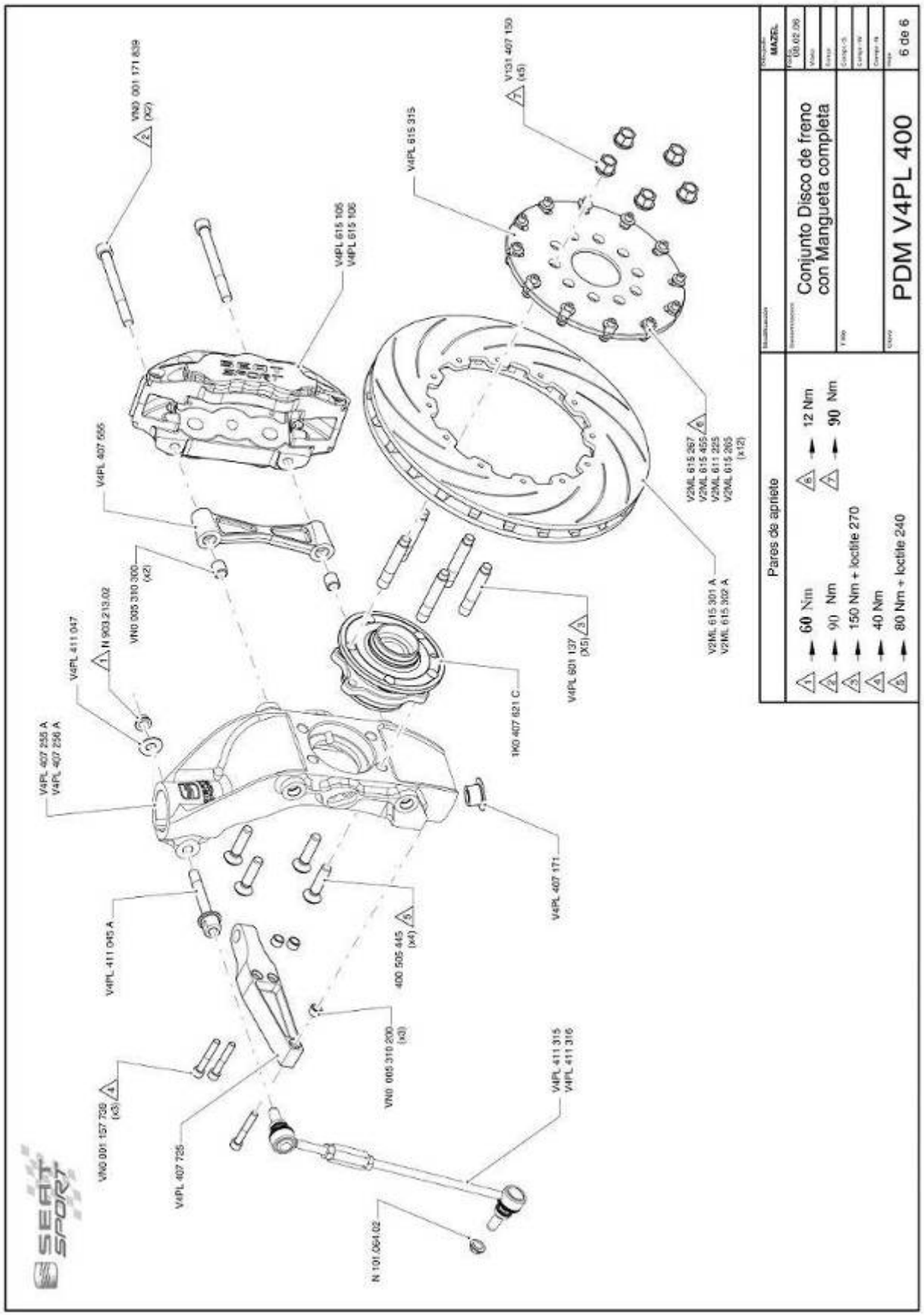
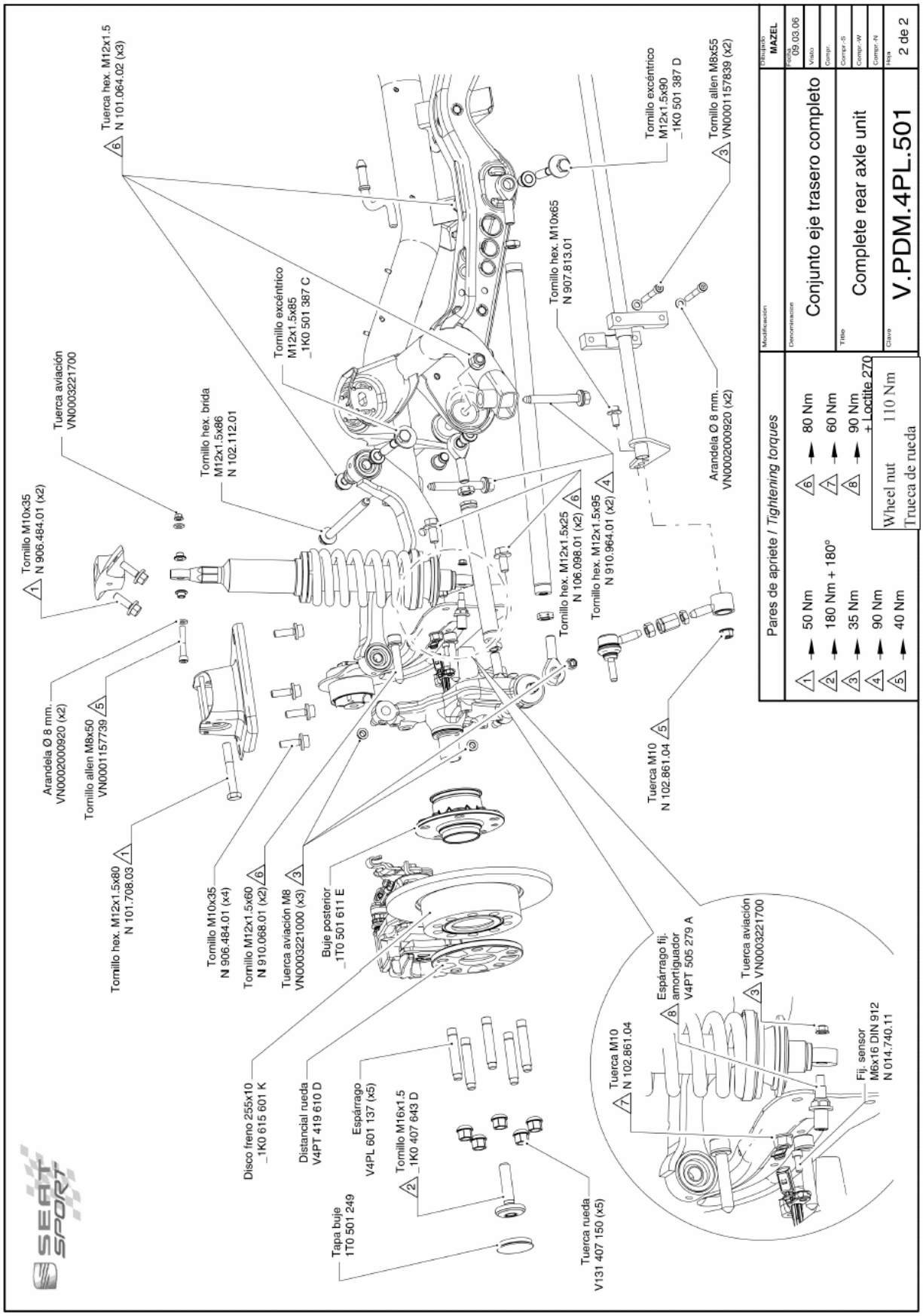
Tuerca aviación M12x1.75
VN0003221200
Tuerca M12x1.5
N 015.081.4
Tuerca hexagonal
M12x1.5x70
N 102.622.01
Pares de apriete / Tightening torques
1 100 Nm
2 55 Nm
3 85 Nm
Modificación
Dibujado MAZEL
Denominación
Conjunto Trapecio
Fecha 08.02.06
Visto
Compr.
Compr.-S
Compr.-W
Compr.-N
Título
Trapezoid unit
Clave
PDM V4PL 400
Hoja 4 de 6


Pares de apriete
60 Nm
90 Nm
150 Nm + loctite 270
40 Nm
80 Nm + loctite 240
12 Nm
90 Nm
Conjunto Disco de freno con Mangueta completa
PDM V4PL 400
6 de 6
MAZEL
08.02.09
V4PL 615 315
V131 407 150 (x5)
V4PL 615 105
V4PL 615 106
V4PL 407 555
V2ML 615 267
V2ML 615 455
V2ML 611 225
V2ML 615 265 (x12)
V2ML 615 301 A
V2ML 615 302 A
V4PL 801 137 (X5)
1K0 407 621 C
V4PL 407 171
V4PL 407 255 A
V4PL 407 256 A
V4PL 411 047
N 903 213 02
VN0 005 310 300 (x2)
V4PL 411 045 A
400 505 445 (x4)
VN0 005 316 200 (x3)
VN0 001 157 726 (x3)
V4PL 407 726
V4PL 411 315
V4PL 411 316
N 101 064 02
VN0 001 171 839 (x2)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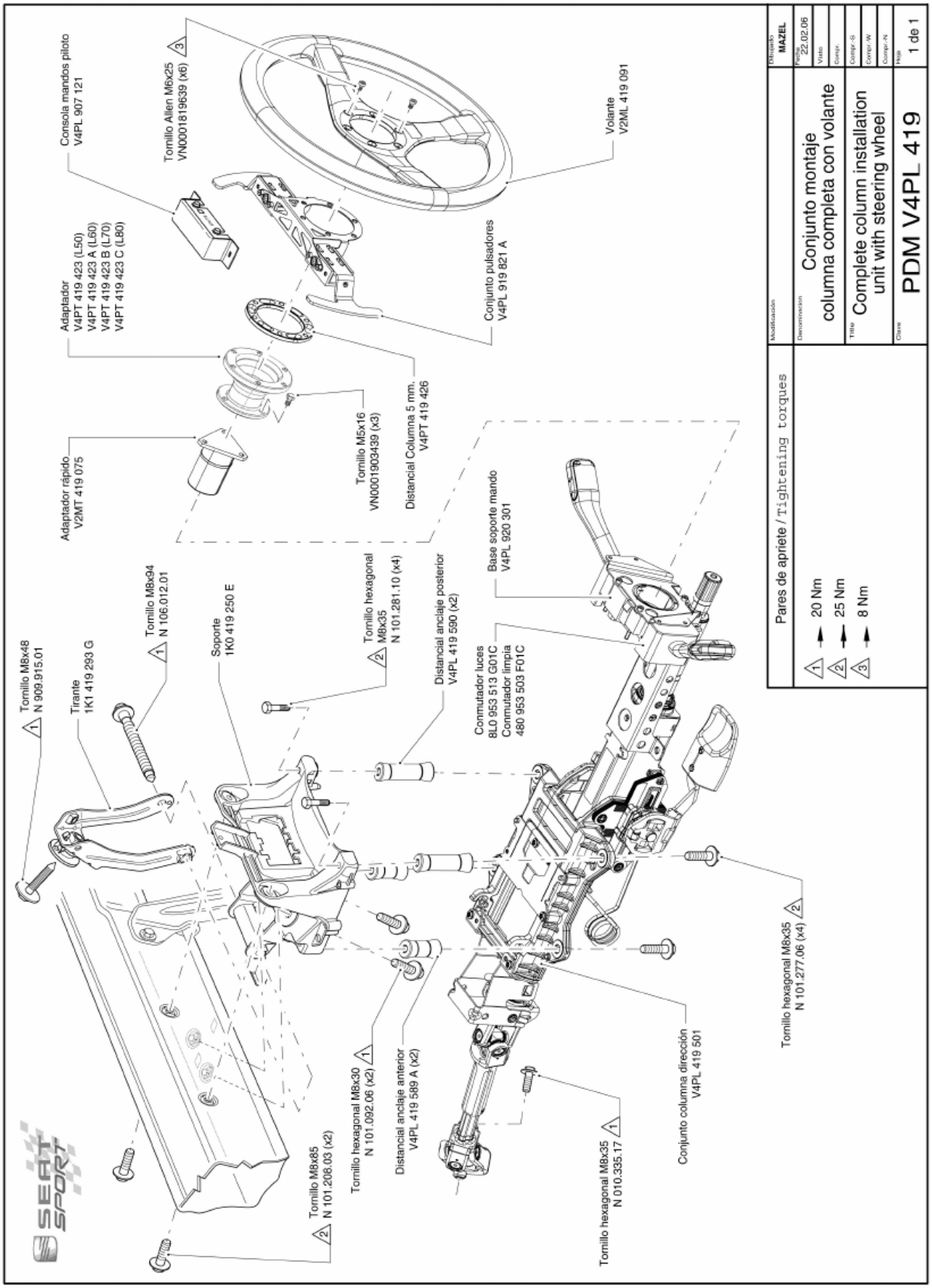
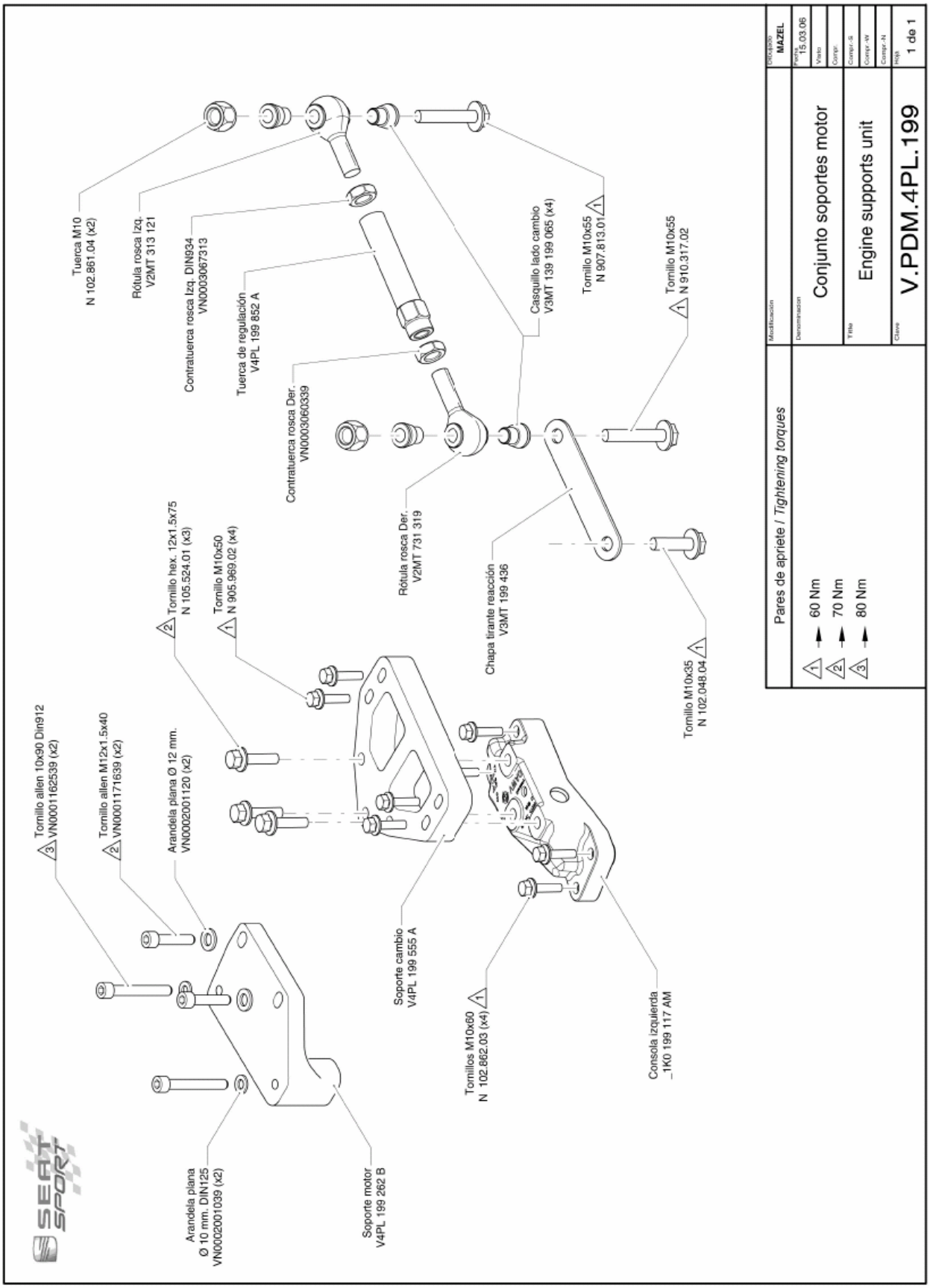
N 101.064.02 (x3)
Tornillo excéntrico
M12x1.5x90
_1K0 501 387 D
Tornillo allen M8x55
VN0001157839 (x2)
Tornillo excéntrico
M12x1.5x85
_1K0 501 387 C
Tornillo hex. M10x65
N 907.813.01
Tornillo M10x35
N 906.484.01 (x2)
Tuerca aviación
VN0003221700
Tornillo hex. brida
M12x1.5x86
N 102.112.01
Arandela Ø 8 mm.
VN0002000920 (x2)
Tornillo allen M8x50
VN0001157739
Tornillo hex. M12x1.5x80
N 101.708.03
Tornillo hex. M12x1.5x25
N 106.098.01 (x2)
Tornillo hex. M12x1.5x95
N 910.964.01 (x2)
Arandela Ø 8 mm.
VN0002000920 (x2)
Tuerca M10
N 102.861.04
Tornillo M10x35
N 906.484.01 (x4)
Tornillo M12x1.5x60
N 910.068.01 (x2)
Tuerca aviación M8
VN0003221000 (x3)
Buje posterior
_1T0 501 611 E
Disco freno 255x10
_1K0 615 601 K
Distancial rueda
V4PT 419 610 D
Espárrago
V4PL 601 137 (x5)
Tornillo M16x1.5
_1K0 407 643 D
Tapa buje
1T0 501 249
Tuerca rueda
V131 407 150 (x5)
Tuerca M10
N 102.861.04
Espárrago fij.
amortiguador
V4PT 505 279 A
Tuerca aviación
VN0003221700
Fij. sensor
M6x16 DIN 912
N 014.740.11
Pares de apriete / Tightening torques
1 → 50 Nm
2 → 180 Nm + 180°
3 → 35 Nm
4 → 90 Nm
5 → 40 Nm
6 → 80 Nm
7 → 60 Nm
8 → 90 Nm
+ Loctite 270
Wheel nut 110 Nm
Trueca de rueda
Modificación
Denominación
Conjunto eje trasero completo
Título
Complete rear axle unit
Clave
V.PDM.4PL.501
Dibujado MAZEL
Fecha 09.03.06
Visto
Compr.
Compr.-S
Compr.-W
Compr.-N
Hoja 2 de 2
SEAT SPORT


Consola mandos piloto
V4PL 907 121
Tornillo Allen M6x25
VN0001819639 (x6)
Volante
V2ML 419 091
Adaptador
V4PT 419 423 (L50)
V4PT 419 423 A (L60)
V4PT 419 423 B (L70)
V4PT 419 423 C (L80)
Conjunto pulsadores
V4PL 919 821 A
Adaptador rápido
V2MT 419 075
Tornillo M5x16
VN0001903439 (x3)
Distancial Columna 5 mm.
V4PT 419 426
Base soporte mando
V4PL 920 301
Tornillo M8x48
N 909.915.01
Tirante
1K1 419 293 G
Tornillo M8x94
N 106.012.01
Soporte
1K0 419 250 E
Tornillo hexagonal
M8x35
N 101.281.10 (x4)
Distancial anclaje posterior
V4PL 419 590 (x2)
Conmutador luces
8L0 953 513 G01C
Conmutador limpia
480 953 503 F01C
Tornillo hexagonal M8x35
N 101.277.06 (x4)
Tornillo M8x85
N 101.208.03 (x2)
Tornillo hexagonal M8x30
N 101.092.06 (x2)
Distancial anclaje anterior
V4PL 419 589 A (x2)
Tornillo hexagonal M8x35
N 010.335.17
Conjunto columna dirección
V4PL 419 501
Pares de apriete / Tightening torques
1 → 20 Nm
2 → 25 Nm
3 → 8 Nm
Modificación
Denominación
Conjunto montaje columna completa con volante
Título
Complete column installation unit with steering wheel
Clave
PDM V4PL 419
Dibujado MAZEL
Fecha 22.02.06
Visto
Comp.
Compr.-S
Compr.-W
Compr.-N
Hoja 1 de 1


Tuerca M10
N 102.861.04 (x2)
Rótula rosca Izq.
V2MT 313 121
Contratuerca rosca Izq. DIN934
VN0003067313
Tuerca de regulación
V4PL 199 852 A
Contratuerca rosca Der.
VN0003060339
Casquillo lado cambio
V3MT 139 199 065 (x4)
Tornillo M10x55
N 907.813.01
Tornillo M10x55
N 910.317.02
Tornillo hex. 12x1.5x75
N 105.524.01 (x3)
Tornillo M10x50
N 905.969.02 (x4)
Rótula rosca Der.
V2MT 731 319
Chapa tirante reacción
V3MT 199 436
Tornillo M10x35
N 102.048.04
Tornillo allen 10x90 Din912
VN0001162539 (x2)
Tornillo allen M12x1.5x40
VN0001171639 (x2)
Arandela plana Ø 12 mm.
VN0002001120 (x2)
Soporte cambio
V4PL 199 555 A
Tornillos M10x60
N 102.862.03 (x4)
Consola izquierda
_1K0 199 117 AM
Arandela plana
Ø 10 mm. DIN125
VN0002001039 (x2)
Soporte motor
V4PL 199 262 B
Pares de apriete / Tightening torques
60 Nm
70 Nm
80 Nm
Modificación
Denominación
Conjunto soportes motor
Título
Engine supports unit
Clave
V.PDM.4PL.199
Dibujado
MAZEL
Fecha
15.03.06
Visto
Compr.
Compr.-It
Compr.-W
Compr.-N
Hoja
1 de 1

3.11 Maintenance intervals

Recommended service intervals

The service intervals recommended in the following table are for guidance purposes only and may differ depending on the particular use of each driver/team. **(Rev.= Review / Sust.= substitution)**

MANTENANCE					
DENOMINATION	EACH RACE	EACH 2000 KM	EACH 6000 KM	EACH 10000 KM	COMMENTS
DIAGNOSIS					
VAS Engine	**Rev.**				**Failures control. Clean sporadic failures**
VAS Gearbox	**Rev.**				**Failures control. Clean sporadic failures**
VAS CAN Bus	**Rev.**				**Failures control. Clean sporadic failures**
Data Logger	**Rev.**				**Data analyse and failures check**
ENGINE					
Complete engine				**Rev.**	**Done only by SEAT Sport**
Spark plug	**Rev.**		**Sust.**		**It's advisable use original parts**
Coils	**Rev.**				**Check no water humidity inside**
Cotton air filter	**Rev.**	**Sust.**			**When substitute done by a SEAT Sport original part.**
Bell poli V		**Rev.**	**Sust.**		**Use original parts**
Engine oil		**Sust**			**Oil 15/40**
Engine oil filter		**Sust.**			**Use original parts**
Turbo			**Rev.**		**Revision only by SEAT Sport**
Knock sensors				**Sust.**	**Substitute**
Lambda prove				**Sust.**	
Fly wheel				**Rev.**	**Angular max movement 1 y 4 tooth /8°.**
Petrol filter			**Sust.**		
Petrol flow pumps		**Rev.**		**Sust.**	**Clean the pre-filter. Check every time that the car had a accident**

MANTENANCE					
DENOMINATION	EACH RACE	EACH 2000 KM	EACH 6000 KM	EACH 10000 KM	COMMENTS
GEARBOX					
Complete Gear box			Rev.		Only done by SEAT Sport
DSG oil			Sust.		Use only DSG oil
DSG oil filter			Sust.		Use only original parts
General rebuilding			Rev.		Only done by SEAT Sport
Drive shaft		Rev.			Check the movement and use only the Seat Sport original grase
ELECTRIC					
Fuses console		Rev.			Check that all is fixt.
Fuses	Rev.				Check color and aspect
Shift pads	Rev.				Check the cables fixations.
BRAKE					
To purge	Rev.	Sust.			See point 3.5 brakes.
Break liquid	Sust.				Use only oil based in glycol (NO Silicona)
Front callipers	Rev.				Clean the pistons before to enter the pistons
Pistons calliper joints	Rev.	Sust.			
Discs	Rev.	Sust.			Check the cracking
Braque balance	Rev.				Check and clean
Rear brake calliper			Sust.		Substitute the calliper and its support

MANTENANCE					
DENOMINATION	EACH RACE	EACH 2000 KM	EACH 6000 KM	EACH 10000 KM	COMMENTS
SUSPENSION					
Wheel nuts		**Sust.**			**Check if a endurance race**
Upright	**Rev.**				**Check fissures if any accident happens**
Front wheelhup bearing				**Sust.**	**Torque bolt is very important**
Rear wheel hup bearing				**Sust.**	**Torque bolt is very important**
Spheric ball				**Sust.**	
Shock absorbers				**Sust.**	**Only done by SEAT Sport**
STEERING					
Steering rack				**Sust.**	**Substitute also if a big crash**
Steering pump	**Rev.**				**If over rpm happens must to be substitute**
High press pipe				**Sust.**	
Steering oil			**Sust.**		**use original VW oil**

3.12 Capacidades de líquidos.

CAPACITIES			
Denomination	Capacity	Type	Recommended specifications
Engine oil	**5,5 litres (with filter)**		**Sintetic 15/40**
Air filter oil	**Humidity**	**Cotton oil filter**	**If very dirty, substitute it**
Gearbox oil	**7 litres (only you can subs. 5lt)**	**VW-Audi DSGG052182**	**Only VW it's admited**
Steering oil	**1.5 litres**	**VW-Audi G004000M2**	
Colant	**6,5 litres**	**Repsol RP700F92**	
Brake liquid	**1 litre**	**Motul 600**	**300°C**
Homocinentic grease	**100 grams**	**GKN Homocinetic**	**Liti based**
Tripod grease	**100 grams**	**GKN Tripod**	

3.13 **Air Jacks**

The air jacks must lift the car with a maximum pressure of 35 bars, you can disconnect the lifting tube once the car has been lifted, as the connection jack is independent of the lowering mechanism.

IMPORTANT NOTE:

Ever the car are lift through the air jack system the air jack assurance must be done.

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